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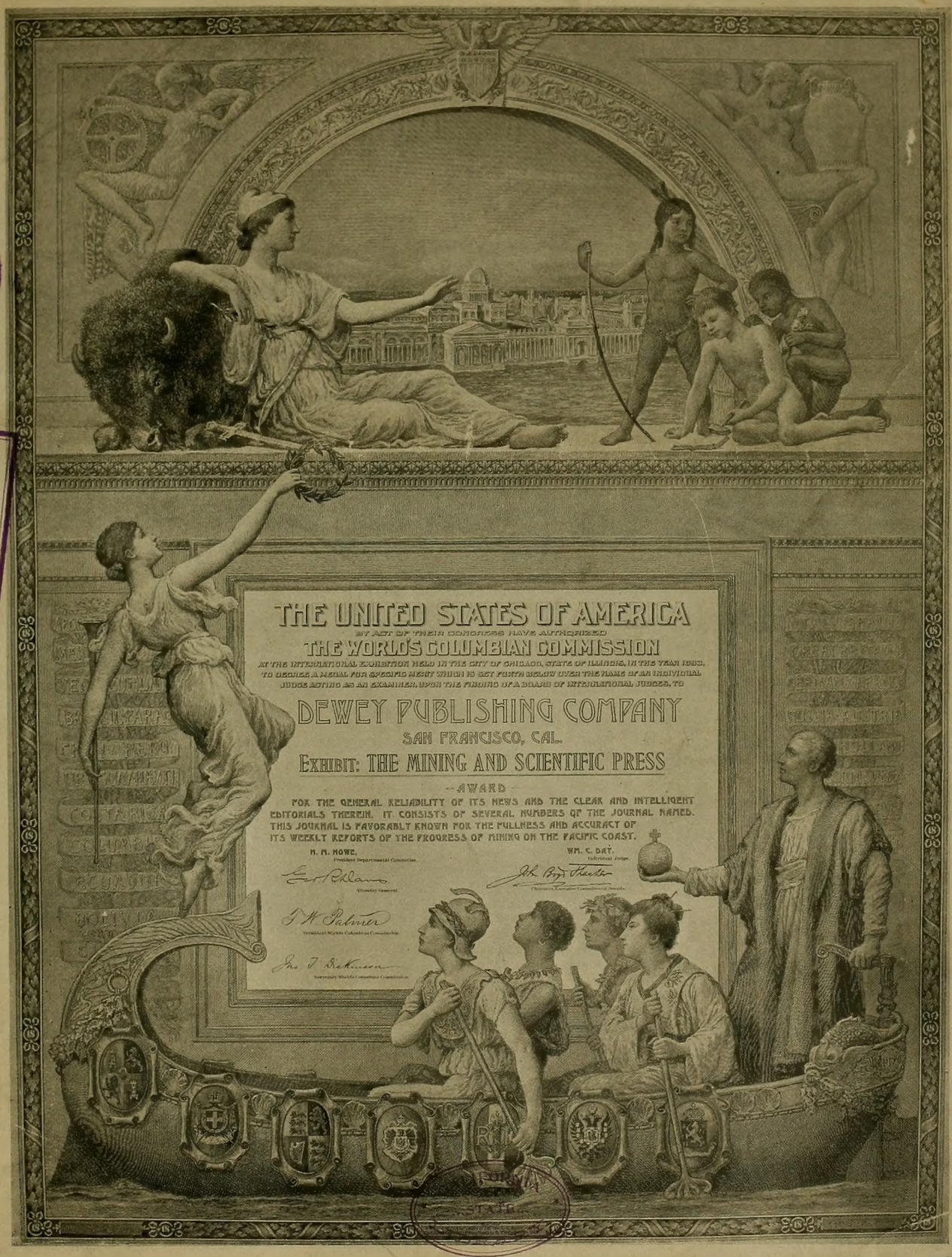
THE UNITED STATES OF AMERICA
BY ACT OF THEIR CONGRESS HAVE AUTHORIZED
THE WORLD'S COLUMBIAN COMMISSION
AT THE INTERNATIONAL EXHIBITION HELD IN THE CITY OF CHICAGO, STATE OF ILLINOIS, IN THE YEAR 1893,
TO DECREE A MEDAL FOR SPECIFIC MERIT WHICH IS SET FORTH BELOW OVER THE NAME OF AN INDIVIDUAL
JUDGE ACTING AS AN EXAMINER, UPON THE FINDING OF A BOARD OF INTERNATIONAL JUDGES, TO
DEWEY PUBLISHING COMPANY
SAN FRANCISCO, CAL.
EXHIBIT: THE MINING AND SCIENTIFIC PRESS
AWARD
FOR THE GENERAL RELIABILITY OF ITS NEWS AND THE CLEAR AND INTELLIGENT
EDITORIALS THEREIN. IT CONSISTS OF SEVERAL NUMBERS OF THE JOURNAL NAMED.
THIS JOURNAL IS FAVORABLY KNOWN FOR THE FULLNESS AND ACCURACY OF
ITS WEEKLY REPORTS OF THE PROGRESS OF MINING ON THE PACIFIC COAST.
H. H. HOWE, President Departmental Committee.
WM. C. DAY, Individual Judge.
J. W. Palmer
Jno. T. Dickinson

THE COLUMBIAN COMMISSION AWARD TO THIS PAPER.

MINING AND SCIENTIFIC PRESS.

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Our latest forms go to press on Thursday evening.

J. F. HALLORAN.....General Manager

San Francisco, July 4, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—The Columbian Commission Award to This Paper, 1. The Pole Line at Fresno; Pipe Line Descending the Hill to the Power House; Reservoir; Power House, Showing End of Pipe Line and Receiver over Pelton Wheels; Interior of Generator Room; Switchboard in the Power House, 5. Picture of a Tornado, 6.

EDITORIAL.—The Question of "Sound Money;" Test of Compressed Air on Street-Car Motors; The Mountain Mines Co., Ltd.; Silver and Miners' Wages; Assessment Work, 2.

ELECTRICAL PROGRESS.—The 35-Mile Electrical Power Transmission at Fresno, Cal., 5. Electric Furnace; Electric Process of Converting Emery into Corundum, 6.

SCIENTIFIC PROGRESS.—Relative Abundance of the Elements; Soda-water Cartridges; Picture of a Tornado; Photography in Colors; Existence of the Three Conditions of Matter; American Society Civil Engineers; A Girl Sees the Roentgen Rays; The Cathode Rays; Reduces the Stiffness of a Board, 6.

MECHANICAL PROGRESS.—Iron Ore Mining at Lake Superior; Sources of Energy After Coal; Sheets of Glass Useful; Figures Relating to Electrical Development; Compressed Air as a Street-Car Motor, 7.

PRACTICAL INFORMATION.—Forests and Stream Flow; Uses of Olive Oil; A Rapid Rate, 7.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 10-11.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 22.

MISCELLANEOUS.—Concentrates, 3. Separation of Silver from Gold by Volatilization; Reduction of Ores in Mexico; Plain Talk on Ore Testing, 4. Index to Volume LXXII, 8-9. California Mines and Miners, 9. Coast Industrial Notes; Personal; Commercial Paragraphs; Recent California Mining Incorporations; Recently Declared Mining Dividends, 14.

Assessment Work.

Ordinarily a multitude of questions are weekly answered in a condensed form in "Concentrates," on page three of each issue, the question itself being omitted for want of space, the answer, in a concise form, often answering several similar inquiries. So many queries have, however, been recently received regarding assessment work, that, at the risk of repetition, the law on the matter is herewith reproduced. While to a majority of our readers such reproduction is manifestly unnecessary, it is to be borne in mind that a great number of new hands at the business have joined the ranks of the miners and prospectors in the past two or three years.

The U. S. mining law applicable to this subject says:

SECTION 2324. The miners of each mining district may make regulations not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground, so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the locations, and such a description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until a patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year: *Provided*, That the period within which the work required to be done annually on all unpatented claims, so located, shall commence on the first day of January succeeding the date of location of such claim. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made by the first day of January, eighteen hundred and seventy-five, and each year thereafter, for each one hundred feet in length along the vein, until a patent has been issued therefor; but where such claims are held in common, such expenditure may be made upon any one claim; and where a person or company has or may run a tunnel for the purpose of developing a lode or lodes, owned by said person or company, the money so expended in said tunnel shall be taken and considered as expended on said lode or lodes, whether located prior to or since the tenth day of May, eighteen hundred and seventy-two, and such person or company shall not be required to perform work on the surface of said lode or lodes in order to hold the same as required by said act. Upon a failure to comply with the foregoing conditions of annual expenditure, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: *Provided*, That the original locators, their heirs, assigns, or legal representatives, have not resumed work upon the claim after failure and before such location. Upon the failure of any one of the co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing or by publication such delinquent should fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners, who have made the required expenditures.

The above includes the amendments of Feb. 11, 1875, and Jan. 22, 1880.

It has been decided that labor performed or money expended on any unpatented mining claim prior to the 1st day of January succeeding its date of location cannot be made a part of or be applied to the first annual expenditure legally required. That is: Upon a claim located any time in 1896 the period within which the required $100 labor or improvement must be performed begins January 1st, 1897, and during the calendar year 1897 such amount of expenditure must be made or the claim will be subject to forfeiture and relocation on Jan. 1st, 1898. No amount of prior expenditure will count.

It is to be noticed that the law in this case is very liberal. Any one who is or who has declared intention to become a citizen can locate and work vacant mineral ground. In the interest of bona fide miners and prospectors the time required to do even enough to hold the claim against any one is stretched to the utmost limit of liberality. One who took up a claim last January or February, or any time this year, has all the year of '96 and all of '97 to do the required amount of work or expenditure. Where two or more jointly own a claim, any one of the co-owners who does his proportional share of the required work can hold his interest.

While the law is thus easy, it is a matter of regret that effort is frequently made to evade it. No miner or prospector can afford to attempt evasion of so liberal a statute.

There is no limit to the number of claims any individual or corporation may take up. But there is obviously a limit to the number that can be worked, and here, too, a dog-in-the-manger policy is too often put in practice, and a man or set of men will try to hold a dozen claims and cover the whole country, when it is impossible for them to do the legal work necessary to hold one. A man should either work the ground claimed or forfeit it; if he can't hold it, let him give it up. It is too common a practice to attempt holding what cannot be utilized, and public sentiment the world over is against the man who "bites off more than he can chew." It may sound hard, but a little reflection will show the would-be monopolist that he is doing himself as great an injustice in his grasping effort as anyone else, and that private gain, as well as public policy, is against the effort to hold more ground than can be developed, at least to the meager extent contemplated in compliance with the letter, but not the spirit, of the law.

Silver and Miners' Wages.

Some papers express surprise that this paper should advocate the remonetization of silver, inasmuch as "this is a gold producing State." That is, like our Atlantic coast brethren, they mix up the issue and fail to see that it is not an industrial question, but a financial one. As the exponent of the miners of this coast, this journal advocates that which is for the best interests of all. Whatever they produce, whether gold, silver, copper or lead, the metal miners have common interest in the matter, for what affects one affects all. Looked at even purely as an industrial proposition; putting it on the narrow, local level suggested by so many papers; taking the simple question of wages paid to working miners, it is evident that the demonetization of silver has hurt the gold miner. Where is the miner to-day who is paid $4 per day, seven days in the week? Up to the time when silver was demonetized wages cut no figure in gold or silver mines. Four dollars a day was the ruling rate, straight through. When the ground was cut away and silver was made a mere commodity, down came the wages of the miner. The fall affected not only the silver miner's daily pay, but it carried down the wages of the man who worked in a gold mine, too. Then, when silver mining was no longer possible and men were discharged by thousands, and the mines shut down, they were obliged to come into competition w[illegible] their former coadjutors. Their experience as silver miners was no longer available, but they could polish the head of a drill, could timber or do other mine work, and many from present necessity sought work in the gold camps. The old story, "two men for one job," had the inevitable result.

This is a phase of the fight not often touched on, but it is a serious matter, and a feature of the unjust fight against silver. It is one of the reasons why this paper advocates silver. Some time ago the writer visiting Nevada City and Grass Valley, two of the most prominent and prosperous gold mining towns on the coast, met many who in the old days of silver activity were able to get good wages and steady work as miners, millmen, etc. They all had the same story: "Everything is shut down where I used to work and I've come here to try to find something to do."

This is something that requires no elaboration. It comes home to every man who ever worked in a mine, and is something that no man who never worked in or around a mine can understand. But the miners understand it, and they know well that beside the poverty of once prosperous mining camps the blight that has fallen on the silver mining industry has indirectly hurt them by bringing their former allies into competition with them in the merciless struggle for existence.

The argument this journal has all along made for silver is on the proposition that the question is a great financial one, and should be lifted out of the narrow local rut of a mere industrial question. But even on that ground it can be shown that every dictate of industrial policy, every sentiment of equal justice, and every suggestion of self-preservation for the working miner favors the rehabilitation of the industry that would restore prosperity to those men. Underlying the weal of all lies this question of employment, and while this paper has never put forward the plea that silver should be remonetized merely to afford employment to miners, yet a little thought will show to a fair thinking man in or out of a newspaper office that even on the ground of silver being an industrial question it is a matter of business. The real reason for favoring the remonetization of silver is because of its great national importance as a financial question affecting all alike whether residents of Maine, Montana or Texas, but even on their own chosen field of argument those who claim that it is only a local industrial question must concede that it is one that directly affects the fortunes of the gold and silver miner alike.

JUST ten years ago San Francisco men bought the "Lost Confidence" mine in Shasta Co. for $125,000, paying $50,000 cash, the rest payable from the mine's net earnings. They built a 20-stamp mill, and, altogether, spent $100,000, when they found that the ore was not free milling. As it carried too little lead for smelting by the processes of that day, and too much base other metal for treatment without wasting, the whole thing was abandoned. Eight years afterward an English company bought the same property for $300,000, and under the name of the Mountain Mines Co., Ltd., have spent as much more in improvements, including a smelter of latest construction and a railway. Preliminary work has not been wholly satisfactory, and the natural reluctance of the managing directors to give information has given rise to a multitude of unauthorized statements. All work is at present suspended, but it is believed that, with the advent of the new roasting plant to be constructed, and some minor changes in the original plans, that success will be attained, and that the property will become a paying one Such projects as the present one require considerable time, outlay and patient experiment.

MECHANICAL and scientific progress are busier than ever with motor experiments. The present week sees a practical test of compressed air on the Chicago General Railway Co.'s lines, and an even more ambitious effort on the part of the New York Central Railway Company, which is experimenting with a still newer style of motor—hot water in supply boilers under high pressure. The technical explanation received suggests the thought that; as between steam and "hot water under high pressure," the latest projector appears to be traveling in a circle.

ACKNOWLEDGMENT is made of the receipt, chiefly from Atlantic sources, of a vast and varied amount of printed and written information and misinformation on the question of "sound money," intended to convince this paper of what one well-intentioned adviser styles its "heresy." Will some one, in this regard, kindly define the meaning of the words "heresy" or "heretic"?

123202

Concentrates.

A "DRIFT" follows the vein: a "crosscut intersects it.

OCTOBER 7th will be "Miners' Day" at the Spokane, Wash., fair.

CYANIDE OF POTASSIUM in ton lots is worth 40 cents per pound here.

"THE richest gold field in the world" is in Georgia, this week.

THE Merced Gold Mining Co.'s $2 assessment is payable on the 12th inst.

THE little list of going silver mines on this coast gives present promise of increase.

LOCAL papers announce the introduction of Japanese labor into the mines of Butte Co.

THE average number of natives employed in the Rand district, South Africa, in 1895 was 55,000.

BRITISH COLUMBIA has many excellent local mining papers, full of fresh and reliable mining items.

THE biggest mill in Los Angeles Co. is believed to be that of the Lone Jack mine—a 60-stamp affair.

GOLD, copper and petroleum are the three mineral products of this State in most present active demand.

KASLO AND NELSON, B. C., protest strongly against "the importation of cheap labor from Ontario and Quebec."

DESPITE unfavorable reports, the Harqua Hala, Arizona, mine is able to show an average monthly net profit of $2500.

THE Champion's 75 stamps are about ready to start, giving it a greater number than any other mine in Nevada Co., Cal.

THE U. S. Debris Commission have several applications for permits to act upon this month. They meet on the 20th inst.

"WITHOUT cyanide," says the London *Mining World*, "the Randt would be almost nothing but a geographical expression."

THE price of lumber at Circle City, Alaska, has come down, and dressed lumber for sluices, etc., can now be had for $120 per M feet.

THE State Mining Bureau is having prepared a list by counties of all the quartz mills in the State, number of stamps, etc.

RETURNS so far as received indicate that the gold yield of the State for the first half of '96 exceeds that of the corresponding part of '95.

THIS is the 1878th issue of this journal, the first number of Vol. 73. With this issue the MINING AND SCIENTIFIC PRESS enters upon its 37th year.

DEFERRING the sale of any mining stock till the title to the claim is perfected, besides being honest, is almost invariably the only mutually satisfactory method.

A PATENT was filed for record in the Siskiyou County Clerk's office of this county last week, granting 87,221.09 acres of land to the Central Pacific Railroad Company.

IN 1893 the gold output of Yavapai county, Arizona, was $339,740; in 1894, $867,840; 1895, $1,258,851. In 1895 the silver output was 256,931 ounces; in 1895, 322,033 ounces.

DISCOVERIES of petroleum at Kisbueena Creek, East Kootenay, B. C., are said to be of sufficient importance to justify the belief that coal oil will be a production of that province.

ONE by two California miners are returning from other fields, where, in most instances, they have achieved substantial success, but realize that there is only one California.

THE Rosemont, Arizona, copper mine has been bought by Lewissohn Bros., N. Y., owners of the Old Dominion mine at Globe, now shut down because of disagreement with the men as to wages.

THE Clear Creek Mining Company is locally credited with having made all the necessary arrangements for the erection of a 20-ton smelter on Clear Creek, nine miles from Redding, Shasta Co., Cal.

THERE is a rising market now for every metal mined. Silver is higher than it has been since December, '93. On March 5th, '94, it was 58¾; now it is 70. Lead and copper also show an appreciation in price.

THE big strike at Leadville, Col., still exists. About 1,200 miners are idle. The mine pumps will not be drawn, thus obviating the expense of unwatering when work is resumed, as of course it ultimately will.

FOR "steady work," probably the Mayflower drift mine, Placer Co., has a record not surpassed by any mine in the State. It has been operated, without the stoppage of a single day's work, for over seven years.

ON page one of this issue is a reduced engraving of the World's Columbian Exposition award to this paper, made in the fall of '93 and but recently received. The original is 26x37 inches and is handsomely framed.

A. J. TRUMBO says the Gover mine, at Amador City, is compelled to pay $16 a ton for the chlorination of its ores and that after the cost of extraction is deducted, the margin is very small. He is again contemplating the cyanide process.

IN the *American Geologist* for June, '96, appears an excellent article on Syenitic Rocks from California, written by H. W. Turner. The rarity of that class of igneous rocks in the Sierra Nevadas lends unusual importance to the article.

THE executive board of the Western Federation of Miners, regarding the strike ordered at Louisville and Leadville, Colorado, and Custer mining district, Idaho, requests miners to "remain away from those places till the strike is settled."

IT is stated that the cost of copper production by the Boston & Montana Co., Butte, Montana, which last year was 5.72 cents per pound, is now less than 5 cents per pound. A Michigan local paper says it costs the Calumet & Hecla 6½ cents per pound.

THERE are twenty-one applications for permits to operate hydraulic mines before the U. S. Debris Commission this week. For several months the commission has been financially unable to do anything, but is now in funds, the $15,000 appropriation being immediately available.

AS in other localities, Portland, Or., business men are embarking in the business of gold mining. Time was when no Oregonian west of Baker City or north of Grant's Pass would talk mines, but hard times make men willing to get the condensed representative of all wealth out of the ground.

SINCE the passage of the River and Harbor bill, appropriating $250,000 for constructing restraining barriers on the tributaries of the Sacramento, there need be no question about the payment of the State Debris Commissioner. It was on the contingency of such appropriation that the controversy hinged.

THE gas trouble in the Con. Virginia mine on the Comstock lode is said to come from the old bonanza workings. From an official source it is learned that this bonanza was 700 feet long, 200 feet wide and 600 feet deep. After the ore was extracted the space was filled in as best it could, but the moving of the Comstock ground causes more or less friction, which ignites the wood in the excavation and causes smoldering fires and poisonous gases.

THE Secretary of the Interior has approved supplementary list 33 A, selected by the Central Pacific Railroad, successor to the California and Oregon line, consisting of 800.68 acres in the Redding district. He has also approved clear list 38, affecting land in the Visalia district.

THE London *Westminster Gazette* says: "The consumption of copper for the twelve months ending June has been 51,000 tons larger than in the preceding year. Since the end of April last there has been a rise in the price of Chili bars to the extent of £2, which is hardly matter for surprise."

CALIFORNIA papers publishing advertisements of transportation companies, setting forth the advantages of immediate departure to the West Australian gold fields, might mitigate the misleading announcements by reproduction of some of our correspondent's letter from there, which appears on page 11.

UNDER the new management the Hale & Norcross mine on the Comstock lode has made several reductions in expenses. Outside of those heretofore reported they have reduced the price of lumber from $19 to $16 per M; wood from $7.50 to $6.50 a cord, and powder from 20 cents a pound to 13½ cents a pound.

THE Secretary of the Washington State Mining Bureau writes that that organization "is a public enterprise for the public good, the objects being the collection and dissemination of reliable information regarding the mines and mineral resources of the Northwest and Alaska," which is a laudable purpose.

NOT even gold mines exceed in dividend-producing capacity some of the country's big copper mines. On May 1st the Anaconda, Montana, Co. paid a $750,000 dividend. On the 13th inst. the Calumet and Hecla, Michigan, will pay a $500,000 dividend, making an aggregate to that date of $45,850,000 profit to its stockholders.

THE $250,000 National appropriation in the river and harbor bill and the $250,000 contingent State appropriation became available last Wednesday for the construction of restraining barriers in the Sacramento, Feather and Yuba rivers, and the board of Government engineers in this city now have the preliminaries of the work under consideration.

SUPERINTENDENT CRONAN of the Hale & Norcross mine, made 48 feet a week in the south drift on the Brunswick lode. This is considered quick work by miners although Cronan does not seem to think it anything worthy of special mention. He had three shifts of men. The drift is of the usual size for running cars and other mining purposes.

BECAUSE of improved transportation, more people and cheaper prices of all supplies, $100 will do as much in the way of mining to-day as $350 would twenty-five years ago. The gold product, however, brings just as much to-day as it did then. This is the only business on earth to-day of which the same thing can with truth be said.

A "STEAM PUMP" is a pump in which the long rods connecting the ram with the piston are dispensed with. The steam cylinder and the water ram being both included in one self-contained machine, and the steam conveyed from the surface to supply the power, the displacement is produced either by a ram or a piston, single or double-acting.

FOLLOWING is the production of the Robinson, South Africa, mine for May: Mill, 120 stamps; 15,589 tons crushed; yield of smelted gold, 12,490 ozs.; from concentrates (by chlorination), 730 ozs.; from tailings (cyanide process), 2245 ozs.; from slimes, 1585 ozs.; from own ore, 17,050 ozs.; from concentrates bought (by chlorination), 2283 ozs.; total, 19,333 ozs.

DURING June bullion was produced for account of the Con. Cal. & Virginia M. Co. at the Morgan mill from 958 tons to the amount of $34,758.19—$17,377.91 gold, $17,378.28 silver. The yield in bullion per ton averaged $36.27. The average assay of the ore per battery samples was $52.36 per ton. The assay value of the ore per ton, per railroad car sample, was $55.95 per ton.

PRACTICALLY all of the field work of the United States Geological Survey is now under way. About forty or fifty geological and almost as many topographical parties have resumed operations throughout the country and will continue until the close of the season in September and October. These parties number from one to three experts each in addition to the laboring assistants.

WHILE the report of a competent mine expert is always entitled to respectful consideration and justly carries great weight, yet it is not always correct or conclusive. Many a good mine has been condemned erroneously. The announcement of the Morning Star drift mine's 60th dividend—$6 per share—recalls the fact that that property was reported upon adversely by two reputable mining engineers.

THE Mount Morgan, Australia, gold mine, a pulverized mass of finely comminuted particles, yielded, in 1895, 128,699 ozs., valued at $2,643,500. That year it paid in dividends $1,500,000. This mine was opened in 1886, and has since yielded 1,331,015 ozs., over 55 tons, of unusually fine gold of a value of $27,233,645, from which $20,375,000 have been paid in dividends. Last May there were 8767 tons concentrates chlorinated, yielding 10,876 ounces gold.

THE old, old "apex question" last week started a $750,000 law suit between the Marion and Geyser Mining Companies, Mercur, Utah. Sometime, before Life's lessons have all been learned, and suns and stars forevermore have set, this matter of "apex" and "extralateral rights" will be straightened out in the only possible way that can give general satisfaction—by a complete revision of the present U. S. mining laws in that respect.

A BANGOR correspondent writes that never in the history of Butte Co. were there so many prospectors at work as at present. He adds that a large number of them are not practical miners, but are out looking for prospects just the same. The same is true in a modified way of nearly every gold producing county in the State. Dull times throughout the State have turned the attention of thousands to the fact that after all the millions in the mountains are now the readiest sources of wealth.

THE Selby Smelting and Lead Co. say that the reports regarding fabulous profits to be made out of the purchase of the Caillot Chlorination Works at Grass Valley are wholly without foundation. The only truth in the report is the price paid for the property, which was $5000, as stated herein. The story that they had made $95,000 was circulated without authority. The purchase was made for the purpose of securing a pile of chlorination tailings for reduction at their works at Vallejo Junction, upon which they only expect at the best a small margin of profit.

A GOOD many remote regions have set up claims to being "the greatest gold producing area," with implied assumption of California's claim thereto, but so far no part of the globe has trenched upon California's other attractions. Now, however, New Zealand is trumpeted as having in addition to some gold, "the finest climate on the earth." This is too much. If there is any one thing that California justly claims superiority in it is its climate, not only in its beauty, but variety. The Land of the Maoris may claim anything else without a remonstrance, but we make a firm stand on climate and will not admit that any other region can justly claim to be the place where simply to feel that we breathe, that we live is worth all the joys that life elsewhere can give.

BRITISH COLUMBIA has its Uitlanders, says the Trail Creek *News*, a considerable and increasing body of gold hunters, who for the last two years have been thronging into the heart of the Kootenay district from the United States. The provincial government has not made the mistake committed by the Volksraad of the Transvaal, however—this is, it has not loaded the newcomers with taxes. It has enacted a new mining law, not unlike that in force in Ontario, and, though received with some murmurs of dissatisfaction by the mining interests, it seems to be easy enough on those interests.

SEVERAL communications have been received relative to the new Rigaud process recently noted herein. The process is being given a practical test on a large scale by the Tancarville Co. near Havre, France, the result being as yet unknown. The claim that the total cost of mining and treating the ore will not exceed $1.80 per ton is not an extraordinary statement. Better results have been attained in California, Alaska and South Dakota. In the latter State, at the Deadwood-Terra mine, a 160-stamp mill crushes 15,000 tons per month of ore that averages $1.80 per ton. The cost of mining and milling it is $1.40 per ton, leaving a monthly profit of $6000.

A SKAGIT, Wash., man sends some asbestos and "talc," asking what he can do with it. If sufficient quantity can be had of the asbestos of the length and fineness of fiber in the sample, it will bring $30 per ton here. The soapstone he sends is of doubtful value, commercially. Talc is used for many things—in the manufacture of paper, "French chalk," household utensils, furnace lining, mineral paint, lubricants, etc. Fine talc, well ground and of uniform character, is worth from $12 to $18 per ton. It should be milled where mined, but the machinery is unique and expensive, and the quality and quantity of the body should be fully determined before any outlay.

JOHN M. DOUGLAS & Co., London, write: "Mining goes on more actively than ever. One hears of the agents of the greatest houses of the world searching America, Africa, Australia, and of late New Zealand, for new good mines, buying only the choicest, not to 'float' for companies, but to work for their own profit—gold, silver and copper, or whatever pays. Strife in South Africa has somewhat hindered progress, but real work, and much preparation for more, goes on all the time. Indian mines are doing well. New Zealand has found some very fine new gold mines. The latter are likely to be largely dealt in here if reports of them be confirmed. West Australia has been laid hold of by the greatest crowd of promoting companies ever seen."

THE mineral products of the United States for the calendar year 1895 are reviewed at length in the mineral resources report of the United States Geological Survey. The report, which was compiled by Dr. David T. Day, chief of division, shows the total value of the product as $611,795,290, against a production valued at $527,368,594 for 1894, an increase of over $84,000,000. The quantity and value of some of the various products for the year were as follows: Pig iron, 9,446,308 tons, $105,398,550; silver, $47,000,000 ounces, $60,766,300; gold, 2,273,629 ounces, $47,000,000; copper, 381,106,868 pounds, $38,682,346; lead, 161,440 tons, $10,665,040; quicksilver, 36,104 flasks, $1,337,131.

DAN DE QUILLE is writing an article for this paper entitled, "The Golden Backbone of the World." This "golden backbone" is the great chain of mountains extending from Terra del Fuego, on the Antarctic ocean, to the Arctic ocean, known as the Andes in South America, as the Sierra Madre in Mexico and as the Rocky mountains in the United States and British Columbia. It is the longest continuous mountain chain on the globe and the most uniform. It is over 9,000 miles in length. It gives birth to the Mississippi, the Amazon and thousands of other great rivers and lakes. On its heights, in Peru and Mexico, was seen the first dawn of the light of civilization among the aborigines of the continent. It has been and still is the world's great storehouse of treasure—gold, silver, precious stones of all kinds and all the useful metals. It saved the civilization of the world and is still saving it. It brought the human race out of the poverty, ignorance and slavery of the Dark Ages and gave them a new start—"a big boom."

THE Government pays for gold at the rate of $20.67 per ounce fine, or $18.60 per ounce standard (.9 fine). There is no charge for coining gold. When the bullion deposited is not suitable for coinage, and requires parting and refining, charges are made for these operations equal to the expense incurred in eliminating the base metals and parting the gold from the silver when the two metals are combined. There is also a charge of 2 cents per ounce for copper required for alloy. Upon gold bullion of standard fineness—that is, containing .9 gold and .1 copper—no charge whatever is imposed. The depositor of gold bullion is allowed 100 cents for every 23.22 grains Troy of pure gold his deposit may contain. A $20 gold piece if melted into a lump would be worth twenty dollars if it lost nothing in the melting. A $20 gold piece is worth twenty dollars by reason of the weight of gold in it, not by reason of the Government stamp or inscription on it. There are 23.22 grains Troy of pure gold in the gold dollar. These grains of gold, in the form of bullion, are worth a dollar at the mint or in the market. The gold obtains no increase of value in coinage. No appreciable part of its value is due to the mint's stamp, for, if melted down, the coin is worth as much as before.

AN English gentleman interested in the development of California mining properties writes this paper from London urging that influence be immediately brought to bear to have the Legislature "pass a law that every mine owner shall make monthly returns under oath, with penalty for not doing so, and let the world know what you have in the shape of productive mines, and if you are mining profitably and want capital for development you will soon get it. When I name California gold mines to any of the big investors they look doubtful. If you have mines for sale you must let it be known and what they are producing as well. In thirty minutes you can lay your hands on the returns of every mine of consequence in Africa, Australia, New Zealand, British Columbia, for every month or year. The returns in British Columbia are sworn to under a severe penalty. You have to let the public know what you are doing in mining if you want them to take any notice of your mining resources." Our correspondent overdoes the thing. In the first place California is not coaxing capital from Great Britain or elsewhere. If foreign investors don't recognize a good field that is their own greatest loss. As to advertising, while it must be confessed that we of this State are remiss in proclaiming our great gold resources, yet official statistics furnish considerable reliable information thereon. The recent bulletin of the State Mining Bureau showing California's mineral production by counties for '95 cannot be excelled as a practical and exact exhibit of the mineral wealth of the State. The suggestion that a law be passed making mine owners furnish "monthly returns under oath," is ridiculous, viewed from a local standpoint.

Separation of Silver from Gold by Volatilization.*

By Dr. Joseph W. Richards.

In making the quantitative blowpipe assay for gold and silver, it is usual to treat 100 milligrams of ore at a single fusion, yielding buttons which are too small to be weighed accurately, but whose weight must be found by measuring carefully their horizontal diameters.

As determined by Plattner (and often verified in the writer's experience), silver buttons weigh 0.6346 of the weight of spheres of silver of the same diameter as measured, and gold buttons 0.7506 of the weight of gold spheres. The buttons obtained usually weigh 0.5 to 1.5 milligrams, and the separation of the silver from the gold in buttons so small is a matter of considerable difficulty. Plattner remarks that no satisfactory method of separation in the dry way is known, and recommends the parting by nitric acid. Working, however, with buttons smaller than pin-heads, it is extremely difficult to boil two or three times with nitric acid, to wash until the silver salt is all removed, and then to gather and melt down the gold, without losing a considerable proportion of the gold in three or four directions.

Knowing that, on long heating, silver gives a coating of oxide on charcoal, and that gold does not, I made experiments to determine whether silver could be thus separated from gold, and have found the method practicable. On heating to a bright-yellow heat (not to whiteness) upon charcoal an alloy of gold and silver, before a sharp-pointed oxidizing flame, the silver volatilizes easily and steadily until there is less than five per cent of silver remaining in the gold. I estimate this volatilization to take place a little above the melting point of copper, say at 1000–1200° C. To remove the remainder of the silver, the heat is raised nearly to whiteness, or to about the melting point of steel (1500° C.). When the silver is entirely eliminated, the gold, at this temperature, begins to volatilize also; in fact, a trace of gold will be carried off with the last of the silver, and if the ash of the charcoal be white it will show a faint crimson coating close to the assay. When this coating is heavy enough to be seen without the use of a lens, the silver has been completely volatilized and the remaining button is pure gold. The amount of gold necessary to give this coating is too small to be determined by weighing or measuring.

Having explained the principle made use of, I will give the further details of conducting the operation. The charcoal should be dense, so as not to burn away too quickly. Too light a charcoal will not stand the five or ten minutes' application to the oxidizing flame without burning through the piece. It should also leave a white ash under the oxidizing flame, so as to furnish a background on which to see the crimson gold coating which determines the end of the operation. It is well, also, to work with a porcelain saucer, or large sheet of clean paper, under the flame, to catch the button in case it should be blown from the charcoal.

In order to perform this separation without excessive exertion, I would recommend that a gas flame not over two centimeters high be used, that the tip of the blowpipe be advanced at least half way through the flame and inclined somewhat sharply downwards, at an angle of about 45°. By observing these simple directions, a very sharp-pointed, needle-like oxidizing flame will be produced, about one centimeter in length to the blue tip, which I have found the best for the purpose in view. To produce this the blowing need not be strong, but it should be kept up steadily. The button, in a shallow cavity near the end of the stick of charcoal, is now brought directly in front of the point of the flame, at about one to two millimeters from the visible blue tip. Its position, of course, is regulated by the temperature observed. The button should not, at this stage, be heated to whiteness, else the silver will boil and cause a loss by sputtering. The charcoal is held inclined towards the flame at an angle of about 30°, so that the flame descends almost vertically upon the button, and thus decreases the liability of its displacement by the force of the blast.

It will be found practicable to continue a blowing for about three minutes without discomfort, at the end of which time the operator may stop to observe the color of the button. Supposing the alloy, on parting, to have been white, it will usually become pale yellow in from three to six minutes. When the alloy exhibits a brass-yellow color, the heat should be raised, and the next blowing continued for not over two minutes. At the end of this time the alloy will usually exhibit nearly the pure gold color, but no gold coating, or, at most, only a trace of it will be seen on the charcoal. After this, the heat should be raised to nearly whiteness, and then continued for not over a minute at a time. If a faint gold coating appears, further heating for one minute will usually develop a distinct crimson coating, visible without the lens, and the alloy will show the pure gold color. It is then taken out, cupelled and weasured.

If the amount of gold present be very small, it is difficult to continue volatilizing silver after the button gets smaller than one-fourth millimeter in diameter. The difficulty is caused by the ash of the charcoal, which, fusing to a slag, envelopes the button. To continue the removal of the silver, should the button arrive at this size without showing the gold color, the operator cupels and measures a pure gold button of about the same size and adds it to the button being treated. The enlarged button is now worked down to pure gold, as before, removed, cupelled and measured. The weight of gold obtained is diminished by the amount added, the difference giving that in the ore.

If the heating to incipient whiteness be continued two or three minutes after the visible gold coating is obtained, a very pretty gold coating of bright, peach-blossom color is obtained, and a sensible amount of gold is lost by volatilization. A pure gold button, one millimeter in diameter, weighing 7.58 milligrams, lost 0.03 milligrams (0.4 per cent) each minute that it was heated to whiteness, and in five minutes gave a beautiful crimson coating. A silver button of similar size lost 18 per cent of its weight, each minute, at only a bright-yellow heat. I estimate the point at which gold begins to volatilize as about the melting-point of soft steel (1500° C.). It is certainly considerably below the melting-point of platinum (1775° C.).

In conclusion, I wish to say that I have tested this method of separation in many different ways, with large and small buttons, and upon alloys rich and poor in gold, and have found the separation to be absolute when the conditions above described are properly observed. I have repeatedly alloyed a gold button with different amounts of silver, and then driven off the silver, the button, after two or three of such separations, remaining of exactly the same size and weight as at the start. In proposing this method of separation, I do not wish to disguise the fact that, to ensure success, it demands a steady hand and an experienced operator, and some practice; but I believe that anyone who has mastered the art of blowpiping sufficiently to make gold and silver assays, can, in a short time, master this method of separating the gold and silver.

[In the discussion of the above paper, it was suggested that the method might be practicable in the ordinary assay of gold and silver, as, at assay offices, if an electrically heated furnace could be devised, in which the buttons could be placed on suitable supports, and kept at the proper temperature to volatilize silver, with a current of air passing over them. The movement to the hottest part of the furnace would suffice to remove the last traces of silver, just as the last traces of lead are removed in cupellation in an ordinary muffle. The process of removing the silver would then resemble cupellation in its general outlines, except that the temperature would be about 300° to 500° higher.]

*Journal Franklin Institute.

Reduction of Ores in Mexico.

To the Editor:—All over this country ores are crushed in old-fashioned one-wheel Chilean mills, driven by three mules for three hours thus nine to a mill, the ore fed and screened by hand, and ground fine in arrastras by one mule, changed every six hours, two mules to one arrastra. Capacity of mill, 3 to 3½ tons per 12 to 14 hours shift, at a cost of $1 per ton; capacity of arrastra, 600 to 800 pounds of ore, taken from mill 4 to 5 mesh fine; cost, $4 per ton; revolutions in both cases about two per minute for 80-mesh product. Thus, while the preparing for treatment costs $5 and the ore from a mine $10 per ton to be taken out and brought to the mill, the cost of the patio ($5 per ton) may be considered a fair average; total, $20 per ton. There is no doubt that, with proper mining, the expense on a ton of ore can be reduced by one-half, and the same with modern methods of crushing and grinding the ore. A four-wheel (five tons each) Chilean mill, at 12 to 15 revolutions, requires as many H. P. and will grind to 80-mesh fine 15 to 20 tons in 24 hours; 300 pounds of wood per ton is an approximate estimate of fuel required; 40 to 50 cents is the cost of this quantity of wood. Should 40 to 50 cents more be reckoned for amortisation of plant, $1 per ton would be the total cost for the whole procedure of crushing and grinding fine, which now costs $5 per ton. With the treatment in the patio similar economies could be made. During 350 years of working mines all over this Republic, there are found scattered immense quantities of such ores, worthless now, which, if turned to advantage, could easily be made profitable. In some localities modern hoisting machinery up to 600 H. P. is on the ground, ready for use. Assay values generally go over $10 to $12 per ton, gold and silver; cost of treatment amounting to $5 to $6 per ton, would leave a profit of 50 per cent on high values on properties that have lain idle for years and are liable to do so. There need be no risk, for, low as silver is, modern methods would make the work profitable. The gold associated with the silver generally alone will pay all expense. For lixiviation, coarser grinding, at correspondingly less cost, allows of the treatment of less free-milling ores cheaper than amalgamation for many ores, especially in the northern parts of Mexico.

Guanajauto, Mex., June 20, '96.

Plain Talk on Ore Testing.*

By a Retired Assayer.

There are men in every line of business who differ greatly upon the principles underlying that special branch and the method under which it should be conducted. Some are honest in their differences, while others are willing to sacrifice their real opinions to any matter of expediency which promises more ready and full returns of cash to their coffers. There are assayers who believe the prospector should be "encouraged" by overstating the value of his ore and who habitually give small returns, from a "trace" to a few dollars per ton, upon ore which they know to be totally barren, thinking by this fraud to keep the miner at work for days, or perhaps months, upon a prospect which will yield nothing, spending valuable time and money to no purpose, save that of giving a few dollars' worth of work to the assayer. Perhaps the prospector sends samples to two different assayers, and one returns him "no trace," while the other gives him a value of a few dollars per ton. The biggest return is almost invariably accepted as correct and the "no trace" man is charged with a failure. Some assayers say it makes no difference whether they return "no trace" or a dollar or two a ton, because in neither case is the ore of any value. I claim the contrary and assert that the accuracy of an assay of ore of very low grade is much more important than that of an ore carrying a hundred dollars per ton, for the reason that in the first case a difference between "no trace" and a dollar or two may decide the expenditure of hundreds or perhaps thousands of dollars in development; while in the latter the ore will be shipped anyway; and we have all learned that the smelters will pay for nothing but the actual contents of the ore. Then, too, these returns of value from valueless ore are often the result of accident or carelessness in the hands of an assayer who has every intention of being honest. A particle of rich ore in the grinder left from the last sample, a salted crucible, a loaded cleaning brush, a dirty mixing cloth, fluxes containing a little precious metal, these and other matters of carelessness, uncleanliness or disorder about the laboratory, are continually making the difference between reliability and worthlessness in the result of assaying. The general public is not competent to judge of the qualifications of an assayer any more than those of a physician. Any man may buy an outfit for a hundred dollars and stick out his shingle "Chemist and Assayer," when in reality he knows no more about the correct application of the principles underlying the trade he professes than the man in the moon. Such instances are more common than many would believe, and sometimes people of intelligence, who would at once realize the foolishness of hunting out the cheapest lawyer or doctor, will give their patronage to such an assayer just because they can get his services a little cheaper than those of a man who is competent in his profession and who realizes the importance of taking pains.

A good assayer is often charged with failure because his customer is ignorant of the first principles of sampling ore. Sometimes a piece of rock is broken in two, the halves sent to different assayers, widely varying results are obtained, and one of the operators is charged with error, when in fact both are correct, and the results are chargeable to the fact that the metal was unevenly disseminated through the sample. It is well to remember that like results can only be reasonably expected when the sample is finely crushed, thoroughly mixed and carefully divided. The careful miner will treat his sample in this way, grinding as fine as his circumstances will permit, mixing and dividing carefully, and in every case reserving a portion of the sample, so that a check assay can be made, if desired. As the best men are liable to an occasional mistake, no conservative miner will expend any large amount of labor or money upon the result of a single assay, but will base his future work upon the concurring results of two or more reliable assayers.

The best practical test of the qualifications of an assayer is his ability to check with the smelters on their shipment pulps, and, if you are in doubt with whom to trust your work, go to your friends who are ore shippers and get them to tell you who they patronize. No man can be honest in this business without making enemies among those customers who have had higher assays elsewhere than he can give them, and who had rather believe their assayer dishonest or incompetent than that their ore is less valuable than they hoped. Remember that good men as a rule can get a fair price for their work. I have in mind an assayer in Colorado who probably does more business than any man in the West, and who charges $2 for a gold and silver assay while others in the same town charge 50 cents, and the chances are that, considering the real value of the results turned out, the $2-man comes the nearer to earning his fee. If there is any trade in which "cheap and nasty" work is utterly valueless, it is in that of the assayer.

*Northwest Mining.

Electrical Progress.

The 35-Mile Electrical Power Transmission at Fresno, Cal.

Fresno, the commercial center of the San Joaquin valley, this State, was recently the scene of the completion of a great work, having for result the electrical transmission commercially over

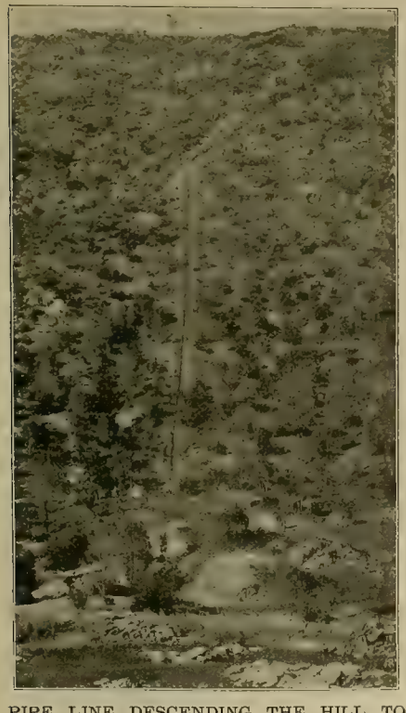
THE POLE LINE.

the longest distance yet attempted of power generated by an artificial fall of water unique in its creation and height.

Not until the successful solution of the problem of long distance power transmission had been reached did the utilization of the San Joaquin river become possible. The San Joaquin Electric Co. adopted the General Electric Company's project and three-phase system of transmission, by which power had already been successfully transmitted from Folsom to Sacramento, a distance of twenty-four miles. The work is now practically complete.

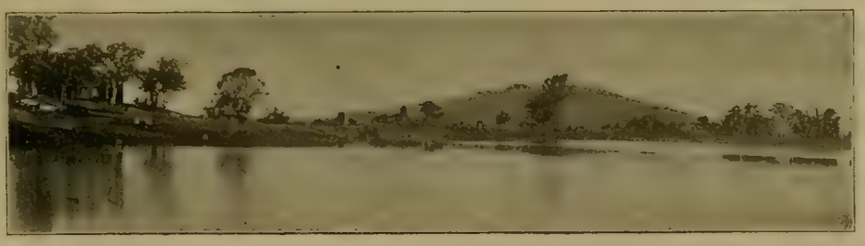
The Hydraulic Plant.—The source of the water power is the North Fork of the San Joaquin, which at the point of diversion runs through a narrow canyon with solid rock walls. The minimum low water flow of the stream at this point is 50 cubic feet per second, which at the head used will develop over 7000 horse power at the water wheels.

From the point of diversion a flume



PIPE LINE DESCENDING THE HILL TO THE POWER HOUSE.

has been built and a canal excavated and carried along the slopes of a hill for a distance of seven miles.



RESERVOIR.

They run along a right of way cleared of all obstructions for a width of 150 feet. The grade is 5.28 feet to the mile, and the lower bank forms a roadway for the inspection wagons. As usual in California valleys, the entire system of headworks and canal is unaffected by frost.

At the end of the canal is a natural basin several acres in extent surrounded for about three-quarters of its distance by a dyke of rock, which, for an expenditure of less than $3000, has been continued in an embankment for the remaining distance and a reservoir for storage water formed which at a maximum depth of only ten feet will be sufficient to operate the plant at full load for several days consecutively. This provision will allow of the ditch and flume being shut off in case of repair or changes.

POWER HOUSE, SHOWING END OF PIPE LINE AND RECEIVER OVER PELTON WHEELS.

The reservoir is located at the top of a high hill, the river being some 1600 feet below. From the pressure box in the reservoir the pipe line, 4100 feet long, is brought down the mountain side, and in this distance the difference in level between the water in the canal and the water in the river below is over 1400 feet. For the first 400 feet the pipe is steel riveted; the balance is lap welded pipe, with lock joints, and at the lower end is $\frac{5}{8}$ of an inch thick by 22 inches in diameter.

At the power house the pipe enters a receiver 57 feet long by 30 inches in diameter, of $\frac{3}{4}$-inch steel, with joints of the butt strap type. This receiver is designed to stand a working pressure of 800 pounds to the square inch.

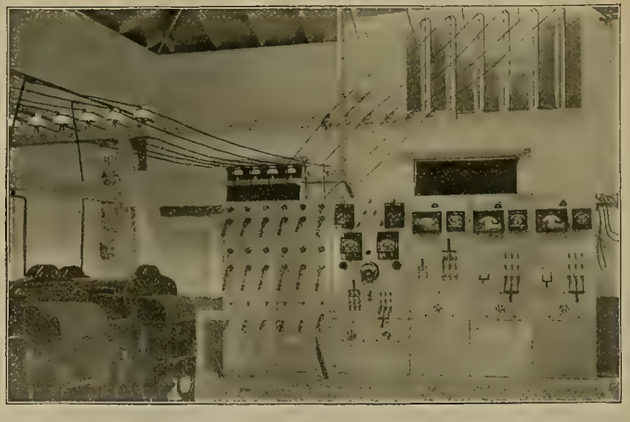
The power house at the bottom of the hill is built of native granite, with a wooden roof. It is 75 feet long by 30 feet wide and is built on a solid bed rock. The receiver and water wheels are outside the main power house, the shafts passing through a heavy granite wall, which effectually keeps all water and moisture out of the dynamo room.

The water wheels are of Pelton make, 57 inches in diameter, each capable of developing 500 H. P. at 600 revolutions per minute under an effective head of 1400 feet, the highest head ever used for power transmission purposes. The wheels are constructed with steel plate centers and bronze buckets, and are fitted with fly wheels 5 feet in diameter. Separate wheels are provided for the exciters. The wheels which drive the generators are provided with Pelton differential governors.

The Electric Plant.—The electric plant consists of three General Electric three-phase generators, each of 350 kilowatts capacity at a speed of 600 revolutions. The armatures are directly connected to the water wheels by insulated flange couplings. The exciters are of the slow speed multipolar type. The current from the generators is delivered to six 125 K. W. step-up transformers of the General Electric air blast type, with secondaries wound for 11,200 volts, to which pressure the current in the transmission line is raised. Provision is left in the generator room for three more transformers of similar capacity. From the transformers the current passes to the switchboard, which consists of six panels, three of which are generator panels, one exciter panel and the other two operate the combination of the six transformers and carry special high tension line switches.

The 11,200 volt circuit, consisting of six bare copper wires, leaves the power house at the upper end, runs up the stream a few hundred feet, crosses the San Joaquin river with a span of 275 feet wide, and is then led up the mountain for a distance of about 2000 feet. The line continues for about ten miles through a rolling, hilly country, easy of access and at all times below the snow line; the rest of the line runs over a flat country and near Fresno passes through wheat fields and vineyards and follows a special right of way and wagon road for the entire distance. The total length of the transmission line from the power house to the sub-station is little short of thirty-five miles, and is thus the longest commercial electric power transmission in the world. The line is strung on special high tension porcelain insulators, made in the porcelain works of the General Electric Company, tested under 27,000 volts, alternating, before shipment. The poles are square redwood, 35 feet long, set 6 feet into the ground and fitted with three heavy cross arms and one small cross arm for telephone wires. As a model of pole line construction the

INTERIOR OF GENERATOR ROOM.



SWITCHBOARD IN THE POWER HOUSE.

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As determined by Plattner (and often verified in the writer's experience), silver buttons weigh 0.6346 of the weight of spheres of silver of the same diameter as measured, and gold buttons 0.7506 of the weight of gold spheres. The buttons obtained usually weigh 0.5 to 1.5 milligrams, and the separation of the silver from the gold in buttons so small is a matter of considerable difficulty. Plattner remarks that no satisfactory method of separation in the dry way is known, and recommends the parting by nitric acid. Working, however, with buttons smaller than pin-heads, it is extremely difficult to boil two or three times with nitric acid, to wash until the silver salt is all removed, and then to gather and melt down the gold, without losing a considerable proportion of the gold in three or four directions.

Knowing that, on long heating, silver gives a coating of oxide on charcoal, and that gold does not, I made experiments to determine whether silver could be thus separated from gold, and have found the method practicable. On heating to a bright-yellow heat (not to whiteness) upon charcoal an alloy of gold and silver, before a sharp-pointed oxidizing flame, the silver volatilizes easily and steadily until there is less than five per cent of silver remaining in the gold. I estimate this volatilization to take place a little above the melting point of copper, say at 1000–1200° C. To remove the remainder of the silver, the heat is raised nearly to whiteness, or to about the melting point of steel (1500° C.). When the silver is entirely eliminated, the gold, at this temperature, begins to volatilize also; in fact, a trace of gold will be carried off with the last of the silver, and if the ash of the charcoal be white it will show a faint crimson coating close to the assay. When this coating is heavy enough to be seen without the use of a lens, the silver has been completely volatilized and the remaining button is pure gold. The amount of gold necessary to give this coating is too small to be determined by weighing or measuring.

Having explained the principle made use of, I will give the further details of conducting the operation. The charcoal should be dense, so as not to burn away too quickly. Too light a charcoal will not stand the five or ten minutes' application to the oxidizing flame without burning through the piece. It should also leave a white ash under the oxidizing flame, so as to furnish a background on which to see the crimson gold coating which determines the end of the operation. It is well, also, to work with a porcelain saucer, or large sheet of clean paper, under the flame, to catch the button in case it should be blown from the charcoal.

In order to perform this separation without excessive exertion, I would recommend that a gas flame not over two centimeters high be used, that the tip of the blowpipe be advanced at least half way through the flame and inclined somewhat sharply downwards, at an angle of about 45°. By observing these simple directions, a very sharp-pointed, needle-like oxidizing flame will be produced, about one centimeter in length to the blue tip, which I have found the best for the purpose in view. To produce this the blowing need not be strong, but it should be kept up steadily. The button, in a shallow cavity near the end of the stick of charcoal, is now brought directly in front of the point of the flame, at about one to two millimeters from the visible blue tip. Its position, of course, is regulated by the temperature observed. The button should not, at this stage, be heated to whiteness, else the silver will boil and cause a loss by sputtering. The charcoal is held inclined towards the flame at an angle of about 30°, so that the flame descends almost vertically upon the button, and thus decreases the liability of its displacement by the force of the blast.

It will be found practicable to continue a blowing for about three minutes without discomfort, at the end of which time the operator may stop to observe the color of the button. Supposing the alloy, on starting, to have been white, it will usually become pale yellow in from three to six minutes. When the alloy exhibits a brass-yellow color, the heat should be raised, and the next blowing continued for not over two minutes. At the end of this time the alloy will usually exhibit nearly the pure gold color, but no gold coating, or, at most, only a trace of it will be seen on the charcoal. After this, the heat should be raised to nearly whiteness, and then continued for not over a minute at a time. If a faint gold coating appears, further heating for one minute will usually develop a distinct crimson coating, visible without the lens, and the alloy will show the pure gold color. It is then taken out, cupelled and measured.

If the amount of gold present be very small, it is difficult to continue volatilizing silver after the button gets smaller than one-fourth millimeter in diameter. The difficulty is caused by the ash of the charcoal, which, fusing to a slag, envelopes the button. To continue the removal of the silver, should the button arrive at this size without showing the gold color, the operator cupels and measures a pure gold button of about the same size and adds it to the button being treated. The enlarged button is now worked down to pure gold, as before, removed, cupelled and measured. The weight of gold obtained is diminished by the amount added, the difference giving that in the ore.

If the heating to incipient whiteness be continued two or three minutes after the visible gold coating is obtained, a very pretty gold coating of bright, peach-blossom color is obtained, and a sensible amount of gold is lost by volatilization. A pure gold button, one millimeter in diameter, weighing 7.58 milligrams, lost 0.03 milligrams (0.4 per cent) each minute that it was heated to whiteness, and in five minutes gave a beautiful crimson coating. A silver button of similar size lost 18 per cent of its weight, each minute, at only a bright-yellow heat. I estimate the point at which gold begins to volatilize as about the melting-point of soft steel (1500° C.). It is certainly considerably below the melting-point of platinum (1775° C.).

In conclusion, I wish to say that I have tested this method of separation in many different ways, with large and small buttons, and upon alloys rich and poor in gold, and have found the separation to be absolute when the conditions above described are properly observed. I have repeatedly alloyed a gold button with different amounts of silver, and then driven off the silver, the button, after two or three of such separations, remaining of exactly the same size and weight as at the start. In proposing this method of separation, I do not wish to disguise the fact that, to ensure success, it demands a steady hand and an experienced operator, and some practice; but I believe that anyone who has mastered the art of blowpiping sufficiently to make gold and silver assays, can, in a short time, master this method of separating the gold and silver.

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*Journal Franklin Institute.

Reduction of Ores in Mexico.

To the Editor:—All over this country ores are crushed in old-fashioned one-wheel Chilean mills, driven by three mules for three hours thus nine to a mill, the ore fed and screened by hand, and ground fine in arrastras by one mule, changed every six hours, two mules to one arrastra. Capacity of mill, 3 to 3½ tons per 12 to 14 hours shift, at a cost of $1 per ton; capacity of arrastra, 600 to 800 pounds of ore, taken from mill 4 to 5 mesh fine; cost, $4 per ton; revolutions in both cases about two per minute for 80-mesh product. Thus, while the preparing for treatment costs $5 and the ore from a mine $10 per ton to be taken out and brought to the mill, the cost of the patio ($5 per ton) may be considered a fair average; total, $20 per ton. There is no doubt that, with proper mining, the expense on a ton of ore can be reduced by one-half, and the same with modern methods of crushing and grinding the ore. A four-wheel (five tons each) Chilean mill, at 12 to 15 revolutions, requires as many H. P. and will grind to 80-mesh fine 15 to 20 tons in 24 hours; 300 pounds of wood per ton is an approximate estimate of fuel required; 40 to 50 cents is the cost of this quantity of wood. Should 40 to 50 cents more be reckoned for amortisation of plant, $1 per ton would be the total cost for the whole procedure of crushing and grinding fine, which now costs $5 per ton. With the treatment in the patio similar economies could be made. During 350 years of working mines all over this Republic, there are found scattered immense quantities of such ores, worthless now, which, if turned to advantage, could easily be made profitable. In some localities modern hoisting machinery up to 600 H. P. is on the ground, ready for use. Assay values generally go over $10 to $12 per ton, gold and silver; cost of treatment amounting to $5 to $6 per ton, would leave a profit of 50 per cent on high values on properties that have lain idle for years and are liable to do so. There need be no risk, for, low as silver is, modern methods would make the work profitable. The gold associated with the silver generally alone will pay all expense. For lixiviation, coarser grinding, at correspondingly less cost, allows of the treatment of less free-milling ores cheaper than amalgamation for many ores, especially in the northern parts of Mexico.

Guanajauto, Mex., June 20, '96.

Plain Talk on Ore Testing.*

By a Retired Assayer.

There are men in every line of business who differ greatly upon the principles underlying that special branch and the method under which it should be conducted. Some are honest in their differences, while others are willing to sacrifice their real opinions to any matter of expediency which promises more ready and full returns of cash to their coffers. There are assayers who believe the prospector should be "encouraged" by overstating the value of his ore and who habitually give small returns, from a "trace" to a few dollars per ton, upon ore which they know to be totally barren, thinking by this fraud to keep the miner at work for days, or perhaps months, upon a prospect which will yield nothing, spending valuable time and money to no purpose, save that of giving a few dollars' worth of work to the assayer. Perhaps the prospector sends samples to two different assayers, and one returns him "no trace," while the other gives him a value of a few dollars per ton. The biggest return is almost invariably accepted as correct and the "no trace" man is charged with a failure. Some assayers say it makes no difference whether they return "no trace" or a dollar or two a ton, because in neither case is the ore of any value. I claim the contrary and assert that the accuracy of an assay of ore of very low grade is much more important than that of an ore carrying a hundred dollars per ton, for the reason that in the first case a difference between "no trace" and a dollar or two may decide the expenditure of hundreds or perhaps thousands of dollars in development; while in the latter the ore will be shipped anyway; and we have all learned that the smelters will pay for nothing but the actual contents of the ore. Then, too, these returns of value from valueless ore are often the result of accident or carelessness in the hands of an assayer who has every intention of being honest. A particle of rich ore in the grinder left from the last sample, a salted crucible, a loaded cleaning brush, a dirty mixing cloth, fluxes containing a little precious metal, these and other matters of carelessness, uncleanliness or disorder about the laboratory, are continually making the difference between reliability and worthlessness in the result of assaying. The general public is not competent to judge of the qualifications of an assayer any more than those of a physician. Any man may buy an outfit for a hundred dollars and stick out his shingle "Chemist and Assayer," when in reality he knows no more about the correct application of the principles underlying the trade he professes than the man in the moon. Such instances are more common than many would believe, and sometimes people of intelligence, who would at once realize the foolishness of hunting out the cheapest lawyer or doctor, will give their patronage to such an assayer just because they can get his services a little cheaper than those of a man who is competent in his profession and who realizes the importance of taking pains.

A good assayer is often charged with failure because his customer is ignorant of the first principles of sampling ore. Sometimes a piece of rock is broken in two, the halves sent to different assayers, widely varying results are obtained, and one of the operators is charged with error, when in fact both are correct, and the results are chargeable to the fact that the metal was unevenly disseminated through the sample. It is well to remember that like results can only be reasonably expected when the sample is finely crushed, thoroughly mixed and carefully divided. The careful miner will treat his sample in this way, grinding as fine as his circumstances will permit, mixing and dividing carefully, and in every case reserving a portion of the sample, so that a check assay can be made, if desired. As the best men are liable to an occasional mistake, no conservative miner will expend any large amount of labor or money upon the result of a single assay, but will base his future work upon the concurring results of two or more reliable assayers.

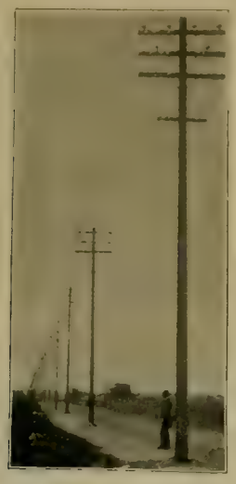
The best practical test of the qualifications of an assayer is his ability to check with the smelters on their shipment pulps, and, if you are in doubt with whom to trust your work, go to your friends who are ore shippers and get them to tell you who they patronize. No man can be honest in this business without making enemies among those customers who have had higher assays elsewhere than he can give them, and who had rather believe their assayer dishonest or incompetent than that their ore is less valuable than they hoped. Remember that good men as a rule can get a fair price for their work. I have in mind an assayer in Colorado who probably does more business than any man in the West, and who charges $2 for a gold and silver assay while others in the same town charge 50 cents, and the chances are that, considering the real value of the results turned out, the $2-man comes the nearer to earning his fee. If there is any trade in which "cheap and nasty" work is utterly valueless, it is in that of the assayer.

*Northwest Mining.

Electrical Progress.

The 35-Mile Electrical Power Transmission at Fresno, Cal.

Fresno, the commercial center of the San Joaquin valley, this State, was recently the scene of the completion of a great work, having for result the electrical transmission commercially over



THE POLE LINE.

the longest distance yet attempted of power generated by an artificial fall of water unique in its creation and height.

Not until the successful solution of the problem of long distance power transmission had been reached did the utilization of the San Joaquin river become possible. The San Joaquin Electric Co. adopted the General Electric Company's project and three-phase system of transmission, by which power had already been successfully transmitted from Folsom to Sacramento, a distance of twenty-four miles. The work is now practically complete.

The Hydraulic Plant.—The source of the water power is the North Fork of the San Joaquin, which at the point of diversion runs through a narrow canyon with solid rock walls. The minimum low water flow of the stream at this point is 50 cubic feet per second, which at the head used will develop over 7000 horse power at the water wheels.

From the point of diversion a flume

PIPE LINE DESCENDING THE HILL TO THE POWER HOUSE.

has been built and a canal excavated and carried along the slopes of a hill for a distance of seven miles. They run along a right of way cleared of all obstructions for a width of 150 feet. The grade is 5.28 feet to the mile, and the lower bank forms a roadway for the inspection wagons. As usual in California valleys, the entire system of headworks and canal is unaffected by frost.

At the end of the canal is a natural basin several acres in extent surrounded for about three-quarters of its distance by a dyke of rock, which, for an expenditure of less than $3000, has been continued in an embankment for the remaining distance and a reservoir for storage water formed which at a maximum depth of only ten feet will be sufficient to operate the plant at full load for several days consecutively. This provision will allow of the ditch and flume being shut off in case of repair or changes.

RESERVOIR.

POWER HOUSE, SHOWING END OF PIPE LINE AND RECEIVER OVER PELTON WHEELS.

The reservoir is located at the top of a high hill, the river being some 1600 feet below. From the pressure box in the reservoir the pipe line, 4100 feet long, is brought down the mountain side, and in this distance the difference in level between the water in the canal and the water in the river below is over 1400 feet. For the first 400 feet the pipe is steel riveted; the balance is lap welded pipe, with lock joints, and at the lower end is $\frac{5}{8}$ of an inch thick by 22 inches in diameter.

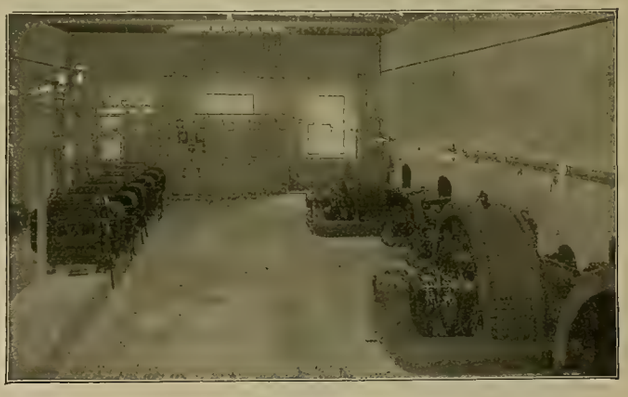
At the power house the pipe enters a receiver 57 feet long by 30 inches in diameter, of $\frac{3}{4}$-inch steel, with joints of the butt strap type. This receiver is designed to stand a working pressure of 800 pounds to the square inch.

The power house at the bottom of the hill is built of native granite, with a wooden roof. It is 75 feet long by 30 feet wide and is built on a solid bed rock. The receiver and water wheels are outside the main power house, the shafts passing through a heavy granite wall, which effectually keeps all water and moisture out of the dynamo room.

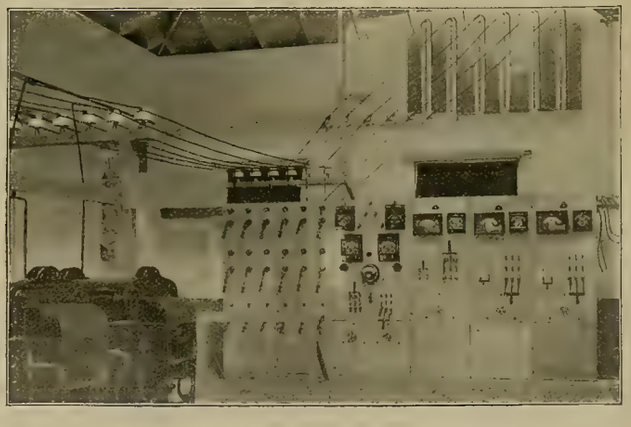
The water wheels are of Pelton make, 57 inches in diameter, each capable of developing 500 H. P. at 600 revolutions per minute under an effective head of 1400 feet, the highest head ever used for power transmission purposes. The wheels are constructed with steel plate centers and bronze buckets, and are fitted with fly wheels 5 feet in diameter. Separate wheels are provided for the exciters. The wheels which drive the generators are provided with Pelton differential governors.

The Electric Plant.—The electric plant consists of three General Electric three-phase generators, each of 350 kilowatts capacity at a speed of 600 revolutions. The armatures are directly connected to the water wheels by insulated flange couplings. The exciters are of the slow speed multipolar type. The current from the generators is delivered to six 125 K. W. step-up transformers of the General Electric air blast type, with secondaries wound for 11,200 volts, to which pressure the current in the transmission line is raised. Provision is left in the generator room for three more transformers of similar capacity. From the transformers the current passes to the switchboard, which consists of six panels, three of which are generator panels, one exciter panel and the other two operate the combination of the six transformers and carry special high tension line switches.

The 11,200 volt circuit, consisting of six bare copper wires, leaves the power house at the upper end, runs up the stream a few hundred feet, crosses the San Joaquin river with a span of 275 feet wide, and is then led up the mountain for a distance of about 2000 feet. The line continues for about ten miles through a rolling, hilly country, easy of access and at all times below the snow line; the rest of the line runs over a flat country and near Fresno passes through wheat fields and vineyards and follows a special right of way and wagon road for the entire distance. The total length of the transmission line from the power house to the sub-station is little short of thirty-five miles, and is thus the longest commercial electric power transmission in the world. The line is strung on special high tension porcelain insulators, made in the porcelain works of the General Electric Company, tested under 27,000 volts, alternating, before shipment. The poles are square redwood, 35 feet long, set 6 feet into the ground and fitted with three heavy cross arms and one small cross arm for telephone wires. As a model of pole line construction the



INTERIOR OF GENERATOR ROOM.



SWITCHBOARD IN THE POWER HOUSE.

Fresno transmission line can compare favorably with any pole line work done in the country.

The sub-station at Fresno is almost in the center of the business portion of the city, and is a brick structure 55 feet by 45 feet. The high pressure circuits entering the house are brought to nine step-down transformers, also of the air blast type. Three of these are of 125 K. W. capacity and reduce the pressure to 200 volts; three of 75 K. W. capacity, with secondaries of 1000 volts, and three are of 40 K. W. capacity, reducing the pressure to 3000 volts. In addition to these transformers the station also contains two 80-light Brush arc machines directly driven by two 60 H. P. three-phase induction motors.

The system of distribution from the sub-station is divided up into three networks. The first, a 200-volt, four-wire, low-tension network, which covers the business portions of the town and having an initial capacity of 6000 16 C. P. incandescent lamps; the second, a 1000-volt, three-phase system, covering the residence districts of the town and having an initial capacity of 4000 16 C. P. incandescent lamps; the third, a 3000-volt, three-phase circuit, designed to furnish current to the numerous vineyards and wineries within a radius of ten miles from the sub-station, for both lighting and power purposes. Motors will also be furnished with current from both the 200 volt and 1000 volt systems.

The policy of the operating company is of a broad gauge character, the end in view being the stimulation of the use of electric power. To effect this end prices are made which compare favorably with that charged for power where steam coal is used.

Electric Furnace.

In the blast furnace method of reducing iron the metal takes up impurities, such as sulphur and silicon, and these are not entirely removed in subsequent treatment by the Bessemer or Martin process. The present methods of smelting must hold the field for ordinary grades of iron; but when purity is of importance, and when special qualities of steel are required, it will probably prove advantageous to prepare pure iron by electrical methods of reduction and to carbonize this subsequently. A furnace suitable for this and similar purposes is described. It is lined, says the American *Manufacturer*, with a basic lining, like a Bessemer converter; this is non-conducting and almost infusible, and keeps the iron free from impurities. In the Heroult furnace used at Neuhausen the positive carbon is vertical, and the material to be fused has to be introduced into the narrow space between this and the walls of the furnace. It is preferable to have a positive electrode consisting of four carbons arranged symmetrically about a vertical axis and inclined at about 20° to it. These can be raised so as to produce an electric arc, or lowered so as to dip into the fused mass; they can also be rotated backward and forward so as to insure a uniform distribution of the heat. The bottom of the furnace is insulated and forms the negative electrode.

An electric process of converting emery into corundum by means of the alternate current arc has recently been patented, says the *Trade Journal Review*. As heat, and not decomposition, is aimed at, continuous currents would be unsuitable. The furnace is made of firebricks and stands on two bridges; the hollow underneath serves as receptacle for the fused mass, there being a small hole in the bottom of the furnace. This hole is covered with a glass plate. The electrodes (carbon rods) are approached to within 1 to 2 inches, the space between being packed with lumps of carbon. The emery, the finest dust, of little use otherwise, is mixed with powdered coal, the amount depending upon the iron oxide in the emery; for 25 per cent of oxide 5 per cent of carbon is reckoned. The coal is soon burned by the oxygen of the iron oxide and the arc forms. The inner mass begins to melt, the glass plate gives way and a stream of fused corundum flows out. The hard outer crust is then broken with iron rods and new material thus fed to the arc. This addition stops the flow, which starts again after 10 or 15 minutes. The baseplate is strewn with fine emery powder, to protect it from the intense heat of the fused mass. The resulting corundum is almost free of water, of which the emery contains about 5 per cent.

Scientific Progress.

Relative Abundance of the Elements.

F. W. Clark has made extensive calculations of the relative abundance of the chemical elements in the earth's crust, the waters, and the air, and reported the results of his work to the U. S. Geological Survey.

In the crust of the earth, with its liquid and gaseous envelopes, seventy-one chemical elements are at present recognized. Others, as yet unknown, are indicated by gaps in the periodic system and will probably be discovered in the future Some of the elements are quite plentiful, and some are exceedingly rare. Nothing is known of the earth's interior. Its surface only is within our certain reach, and from the composition of that we must draw nearly all our conclusions. The average crust of the earth is computable, and Mr. Clark's calculation gives results which are in some respects surprising.

In order to have a definite mass under consideration, he assumes for the earth's known crust a thickness of ten miles below sea-level. The volume of that crust, including the mean elevation of the continents above the sea, is 1,935,000,000 cubic miles. Of this amount 302,000,000 cubic miles are ocean and 1,633,000,000 are solid matter. The mass of the atmosphere is equivalent to that of 1,268,000 cubic miles water, the unit of density. From this data it is computed that the earth's crust, to a depth of ten miles, is composed essentially of 93 per cent solid and 7 per cent liquid matter.

From a large number of analyses, and a mass of corroborative evidence, Mr. Clark deduces the following table of the relative abundance of the more common elements. Quantities less than 0.01 per cent are left out of consideration.

	Solid crust, 93 per cent.	*Ocean, 7 per cent.*	*Mean, including air.*
Oxygen	47.26	85.79	46.98
Silicon	27.21	.....	25.30
Aluminum	7.81	.....	7.26
Iron	5.46	.....	5.08
Calcium	3.77	.05	3.51
Magnesium	2.68	.14	2.50
Sodium	2.36	1.14	2.28
Potassium	2.40	.04	2.23
Hydrogen	.21	10.67	.94
Titanium	.33	.....	.30
Carbon	.22	.002	.21
Chlorine	0.1	2.07	.15
Bromine	....	.008	
Phosphorous	.70	.....	.09
Manganese	.08	.....	.07
Sulphur	.03+	.09	.04+
Barium	.03	.....	.03
Nitrogen	....	.....	.02
Chromium	.01	.....	.01
	100.00	100.00	100.00

Nineteen of the elements are here provided for with very varying degrees of probability, although their order in the last column is presumably correct. The uncertainty may reach one per cent in the cases of silicon and iron, one-half as much with aluminum and oxygen, and is proportionateless for the other elements specified. The remaining elements, more than fifty in number, can hardly aggregate over one per cent altogether, and not one of them could pass 0.05 per cent in relative quantity.

Soda-water cartridges or "gas drops," for making aerated water at home or wherever one may be traveling, are now being put on the market. The steel shell is pear-shaped, about ⅝-inch in diameter at the largest part, and is filled with liquid carbonic acid at a pressure of 60 atmospheres. The cartridge fits into the mouth-piece of a soda-water bottle. A cap is closed over it, and in completing the closure a tiny ebonite plug in one end of the cartridge is punctured, when the gas escapes into the bottle and is dissolved in the water. A dozen of the gas drops weigh three ounces, and 5,000 of them can be packed in a cubic foot.

Picture of a Tornado.

A photograph of a tornado is herewith reproduced from the *Engineering News*. It was taken at Oklahoma City, Oklahoma Territory, 4 P. M., May 14th. The tornado was about six miles distant when the photograph was taken, and a rough computation indicates a probable diameter of the funnel of

about 1000 feet. The print should show the sky much darker than it does, but a tornado is not an easy subject to photograph, most people who have seen one finding other things to occupy their time than taking pictures of the threatening spiral. So far as known this is the first actual photograph of a tornado ever published, and it is believed that only one other has ever been taken. This is referred to in Russell's "Meteorology" as having been secured at the Howard mines, South Dakota, on August 28th, 1884, the cloud then being twenty-two miles away. The accompanying picture as a work of art is a failure, but it may give our readers some idea of how one of those terrible visitants looks.

Photography in Colors.

The Natural Color and Photographing and Printing Company have incorporated at Richmond, Va. The process requires a specially ruled screen and paper. A multi-colored screen ruled by very fine lines, formed of dots or small particles is employed. The screen is ruled with lines in these colors, about 300 to an inch. This screen is placed in front and in close contact with an orthochromatic plate, which is then exposed in the camera to the object to be photographed. The ordinary black and white negative is thus obtained in lines corresponding to the screen in register. From this negative a positive is made in the ordinary way on glass or paper. Jas. W. McDonough of Chicago, the inventor of the process, claims that if the screen or a similarly ruled one be laid on the positive, and moved until the positive and screen are in register, the picture comes out in original colors.

Prof. Graham in 1863 thought that the three conditions of matter—liquid, solid and gaseous—probably always exist in every liquid or solid substance, but that one predominates over the others. Spring in 1886 proved that alloys may be formed by the strong compression of the finely divided constituent metals, at ordinary temperature, and in 1894 that the solid metals may be made to unite by pressure at temperatures considerably below their melting points. Continuing the experiments, Prof. Roberts-Austen has placed a solid cylinder of lead three inches long on a base of gold or gold-lead alloy, keeping them first at a temperature of 251°, or 75° below the melting point of lead, for thirty-one days. On cutting up the lead, a certain amount of gold in each section could be found. More surprising still, it was then discovered that the gold will penetrate to the top of the cylinder in appreciable quantity in three days at a temperature of 100°, and there is evidence that slow diffusion of gold in lead occurs at the ordinary temperature. There is also reason to believe that gold would diffuse in silver and copper in a similar manner. The passage of solid carbon into iron—a phenomenon long familiar to the steelmaker—is shown by Prof. Roberts-Austen's researches to be really comparable with a diffusion of salts in water, and it obeys the same laws.

American Society Civil Engineers.

The twenty-ninth annual convention of the American Society of Civil Engineers opened in the Academy of Sciences in this city at 10 A. M. last Monday, the 29th ult.—the first time the society has thus met west of the Rocky mountains. The officers of the California association—Luther Wagoner, Pres't; Marsden Manson, V. P.; Otto Von Geldern, Sec.; and G. F. Schild, Treas.—with other members of the association, met and welcomed the visiting members, who were scheduled to arrive at 20:45 o'clock, on the 28th, but who were delayed some hours. The morning session began at 10 o'clock on the 29th, the afternoon session at 1:40 o'clock. In the evening a public reception was held at 20:30 o'clock in the Palace Hotel. Tuesday morning was devoted to excursions and sight-seeing; at 20 o'clock Thos. Curtis Clarke, president American Society Civil Engineers, delivered the annual address. On Wednesday the visitors inspected some of the power houses in the city. In the evening papers were read on "Flow of Water in Wrought and Cast Iron Pipes from 28 to 42 Inches in Diameter," by Isaac W. Smith, M. Am. Soc. C. E.

"A Water Power and Compressed Air Transmission Plant for the North Star Mining Company, Grass Valley, Cal.," by A. D. Foote, M. Am. Soc. C. E.

"The Condition of Steel in Bridge Pins," by A. C. Cunningham, M. Am. Soc. C. E.

"Improving the Entrance to a Bar Harbor by a Single Jetty," by Thomas W. Symons, M. Am. Soc. C. E.

"The Construction of a Light Mountain Railroad in the Republic of Colombia," by E. J. Chibas, Associate member Am. Soc. C. E.

On Thursday the State University at Berkeley and Stanford University at Palo Alto were visited. Friday was devoted to further excursions and observations, and on Friday evening most of the visitors started eastward.

A girl who can see the Rontgen rays has been found by Dr. Brandes, of Halle. Starting from the fact that the rays do not penetrate lenses, he hunted for some one the lens of whose eyes had been removed, an operation performed not rarely for extreme short-sightedness or for cataract. The girl, who had had the lens of her left eye removed, was able to see the light with it, though her right eye, which retained its lens, could see nothing. Dr. Brandes asserts that the rays affect the retina of the eye, and if any one's head is enclosed in on opaque vessel near the source of the rays the light can be seen even with closed eyes.

The cathode rays of Crooks and Hittorf tubes can be deflected by a strong magnetic field, Herr Kr. Birkeland has found, and can even be so concentrated upon the side of the tube as to melt the glass. This leads to a new theory of the aurora borealis. Herr A. Paulsen, the Danish meteorologist, suggests that the aurora is due to phosphorescence produced by cathode rays in the upper air, and Birkeland points out the earth's magnetism may be the cause of the intensifying of the phosphorescence near the poles.

Doubling the length of a board or timber reduces the stiffness eightfold and the strength one-half. Doubling the width of a board doubles the stiffness and strength. Doubling the thickness of a board or the depth of a timber increases the stiffness about

eightfold and the strength fourfold. If, therefore, it is desired to double the length and retain the same stiffness, it is necessary to double the thickness or depth.

Mechanical Progress.

Iron Ore Mining at Lake Superior.

The practical exploitation of Lake Superior iron ores, which have developed an enormous trade, occurred about the same time the copper mines were first operated; but, beyond treating the ores in local forges, little use was made of them until the year 1856, when the first iron ore was shipped from Marquette. For a long time the range near Marquette, which bears its name, supplied all of the ore, but in 1877 the Menominee range to the south was exploited and opened for business. While this range is considered, as in the Lake Superior region, most of its ore is shipped via Lake Michigan, thus saving the delay of locking through the St. Mary's ship canal and having less detention from ice in winter. Seven years later, says John Birkenbine, the third and fourth ranges—the Gogebic in Michigan and Wisconsin and the Vermilion in Minnesota—were opened, and within the past three years another range—the Mesabi in Minnesota—has been attracting attention by the size and character of its deposits and the ease with which the ore is won. As new ranges were discovered and new mines opened, markets were found for the increased outputs, and nearly 10,500,000 tons were sent from the mines of the Lake Superior district in 1895, enormous quantities having been obtained from individual operations. Up to the close of 1895, eleven mines had each contributed totals of from 3,000,000 to 6,800,000 long tons, as much as 1,000,000 tons were produced by a single operation in one year, and for a decade the average output of one mine has been 500,000 tons per year, while several mines for shorter periods had records almost as large. The total amount of iron ore which has been won from the Lake Superior iron mines to date exceeds 100,000,000 gross tons.

Some of the hoisting plants at these mines are excellent examples of mechanical construction. The Chapin iron ore mine has a vertical compound pumping engine, with cylinders 50 and 100 inches in diameter and 10 feet stroke, designed to deliver 3,000 gallons per minute from a depth of 1,500 feet. The plunger pumps, 28 inches in diameter and 10 feet stroke, are connected to the engine through a horizontal beam, and also to a 40-feet fly-wheel weighing 160 tons.

At this same mine the entire power equipment is arranged to work either with steam or with compressed air, the latter being developed by a waterfall three miles distant and conveyed to the mine in a 30-inch wrought iron pipe laid on the surface and fitted with expansion joints. One of the shafts of the Chapin mine was sunk through quicksand by freezing the sand into solid masses, which were then blasted out.

The methods of mining iron ores vary, according to the character of the deposit, from stripping and mining with the steam shovel, to working with rock drills 1,450 feet below the surface of the earth. Some mines are wrought open cut, but the majority are operated underground, all the different methods of long-wall mining, caving, milling, overhand and underhand stoping, as well as the various systems of timbering and filling, being in active use in the iron ore mines of Lake Superior. The character of the ore also varies from soft material, easily handled by the shovel, to rock so hard as to severely test the tools and apparatus employed. Rock drills of the same size and working under similar pressures, which bored 100 to 120 feet in ten hours in the limestone of the Chicago drainage canal, could not cut more than 5 to 6 feet in hard Minnesota and 18 to 20 feet in hard Marquette ores in the same time.

A statement of the cost of mining ore at one of the large iron ore mines, from a depth of 500 feet below the surface, shows:

	Cents Per Ton.
Actual mining cost, including labor, explosives, light, etc	44
To which must be added timbering	6
Operating machinery and office expenses	6
Repairs	3½
Loading and sorting ore	3½
Insurance and other expenses	2½
A total for ore loaded on cars of	65

for all charges at the mine except royalty and interest.

Sources of Energy After Coal.

Long before the coal fields of the world are exhausted, there is little doubt the workers on the borderland of engineering will have discovered some plan of tapping the inconceivably great stores of energy around us. The very earth we live on is whirling around like a huge flywheel, and if we could only find some way of utilizing its momentum we could draw upon it for ages for all the power we want without appreciably affecting the speed of its revolution or the length of our day. It is, indeed, naturally drawn upon now in various things intimately associated with the work of the harbor and dock engineer.

The flow of the tide in enormous volumne up and down a river is accompanied by a vast expenditure of power in overcoming the frictional resistance of the river bed, in the grinding of shingle into sand and in the transport of sandbanks from one part of the river to another. Even the flow of the water through the sluices of locks involves a loss of energy, as does the working of a tide mill, which latter is one way of utilizing, as the others are of destroying, some of the earth's momentum. No true engineer will believe that with so many sources of energy around us the progress of mankind and the work of the engineer will cease with the exhaustion of our coal fields.—Cassier's Magazine, July.

SHEETS of glass in which there is a network of wire have come into use recently for skylights and other windows where large panes are desirable, and where there is a liability to breakage from flying sticks or stones. Another virtue has recently been discovered in this fabric. Such glass offers a better barrier to the progress of fire than the ordinary article does. Some tests have been made by insurance experts in Boston. A stove was constructed in the form of a fireplace, and wire-glass blowers were set up in front of it. Resinous wood, drenched with kerosene, was burned in this stove. Where the glass was very hot, cold water was thrown on it from the outside. The material was badly cracked, but it hung together. These and similar experiments in Philadelphia lead to the conclusion that in especially exposed places in the large factories wire glass is preferable to any other variety.

A NEW YORK PAPER gives the following figures relating to electrical development: The capital invested in electric lighting is put at $325,000,000; invested in private plants, $200,000,000; number of arc lights in use, 250,000; capital invested in electric mining machinery, $100,000,000; invested in 500,000 stationary electric motors, $60,000,000. Concerns that use from 50 to 100 motors each are very numerous. It is estimated that more than 90 per cent of all the street and suburban roads are operated by electricity; number of trolley cars, 25,000; total miles, 12,000; combined capital of electrical railways, $700,000,000; total investment in electrical industry is placed at $1,410,000,000, covering a period of fifteen years; number of men estimated to be employed in electrical industries, 2,500,000.

LAST Wednesday began a test in Chicago that will attract universal interest. Compressed air will be experimented upon as a street car motor, the trial to last four months on the tracks of the Chicago General Railway Co.

Practical Information.

Forests and Stream Flow.

Californians are surely interested in observations on the effects of mountain forests upon the flow of water in streams. Hitherto all the preaching has been to show that deforesting causes rapid downflow of water and destruction of lowlands, both directly by erosion and indirectly by drouth. Most telling instances of such results are familiar to all who are informed on that subject. But there are now published some observations by R. L. Fulton, a well-known citizen of Nevada, which seem to indicate that under certain conditions these results do not ensue, but that rather a contrary effect is produced. These are considered by Mr. Fulton in a communication to *Science*.

The Character of the Forest Growths.—Many close observers, after long years of study, have been led to believe that if there is any difference in the flow of streams and the size of springs before and after the trees are cut from above them, the balance is in favor of the open country. The water which drops on shaded ground which is thickly overspread with spongy leaves and the air so near the dew point that it cannot absorb much more moisture should be held back, while that coming down on open ground should run off quickly, seems very natural, but in high mountain regions there are peculiar conditions which do much to modify the action of the law. The pine and the fir are the only trees found growing at high altitudes in any abundance, and their thin needles do not make the heavy shade when on the tree, nor the thick mat when lying on the ground, that the broad leaves of the oak, beech and maple do. Instead of forming a spongy layer five or six inches thick, they are swept about by the wind, and it is not unusual to see the ground bare under the trees, and all the needles lodged somewhere in drifts. Even when they lie where they fall, the coating is comparatively worthless so far as retaining moisture is concerned.

On the other hand, the foliage on this class of trees being as heavy in winter as in summer, the branches catch an immense amount of the falling snow and hold it up in midair for both sun and air to work upon, and only those who have had experience of the absorbing power of the dry mountain air can form any idea of the loss from that source. Such as is melted falls upon that beneath, and breaking the surface sets in operation the forces which are always ready to attack such substances. The theory that the shade protects the moisture-laden soil means but little in such places.

How Trees Melt the Snow.—In a timber belt the snow fall is comparatively evenly distributed, and by the radiation and reflection of heat from its own body each particular tree immediately sets itself to work to clear the ground around it, and long before there is a vacant foot out in the open a space will be bared for several feet around each trunk.

So long as there is no color but pure white for the sun's rays to work upon, its heat is largely latent, but let a stick or straw break the surface, and it will melt the snow or ice for several times its diameter on every side, and stand alone in a few hours. Precisely the same is true upon a larger scale of every stump and tree in a forest.

Observations made at Cornell several years ago bear out this assertion that the presence of trees assists, rather than retards, the melting of the snow, it being shown that the temperature of a wooded belt is two to four degrees higher than that of an adjoining wooded field.

How the Snow Is Conserved.—The strongest force at work to save our rivers is the drifting winds which heap up the snow in great banks, and in this the trees are a constant obstacle. There will be miniature drifts, it is true, but nothing to what there are when there is no obstruction. Outside the timber belt, where there is nothing to catch the snow as it falls and nothing to break the force of the wind, one of the most powerful and active agents in preserving the water supply of a country comes into play. By forming solid bodies of snow the most effective means of saving water for summer is reached.

Observations on the Eastern Slope of the Sierra Nevada.—Among the settlers at the eastern base of the Sierra Nevada, where the timber has been cut for the Comstock mines, the majority believe that this cutting has improved both the regularity and the quantity of the water flow available for irrigation, owing to the fact just stated—the formation of large, compact drifts, which stand unmelted late into the spring. In this same connection Mr. Fulton remarks:

To attempt to hold back an adequate supply of water for a great region like that lying below the Sierra Nevada range in any except a solid state would be utterly useless. Nothing in a liquid form would tarry long on a heavy grade. No shade or mat of leaves would be strong enough to overcome the law of gravitation to that extent. Nothing could detain it but a short time at the farthest, and if it were not for the vast drifts which hold the snow in an icy grasp until late in the summer, all the horrors prophesied from spring floods and summer drouths would be realized.

Mr. Fulton asserts, in conclusion, that he is merely anxious to establish what he believes to be the truth; he is certainly no enemy of the trees. He says in his final paragraph:

In any case I do not wish to be understood as favoring the destruction of the forests of this or any other country. I never cut down a tree in my life and never saw one fall without feeling that I had lost a friend. Whatever is proven, there will always be abundant reasons for preserving extensive tracts of woodland everywhere that trees will grow, and it is time the matter became one of public concern.

OLIVE OIL is now used in many ways at one time never thought of. Besides being more largely used medicinally, it enters into various processes of cooking much more extensively than it did. It is well known that eggs fried in good olive oil are much better flavored than when any kind of fat has been used. In massage, bathing, and for numerous other purposes, the use of this most natural valuable food is greatly extending. The value of good olive oil is beginning to be much more generally recognized throughout the world than it formerly was. Eminent authorities have experimented with it and found it a potent agent for any defects of the excretory ducts, especially the skin. Eczema has rapidly disappeared upon a discontinuance of starch foods and a substitution of a diet of fresh and dried fruits, milk, eggs and olive oil. Its beneficial effects when taken in conjunction with a fruit diet have frequently been remarked upon the hair, nails and scalp, quickly clearing the latter of scurf and supplying to the sebaceous glands the oily substance which they secrete when in a healthy condition, and the absence of which is the cause of debility of the hair, frequently ending in baldness. It has long been observed that those who look upon olive oil as a common article of food, and take it as such, are generally healthier and in better condition than those who do not. Its therapeutic and prophylactic properties are now well know to medical men. Oil is destructive to certain forms of micro-organic life, and it is reasonable to suppose that they can best be eradicated from the system by its internal use. The use of oil not only does this, but it restores to the worn-out or diseased tissue just those elements of repair that its reconstruction demands.

CHIEF ELECTRICIAN HEFT of the New York and Hartford Railroad ran an electric car at the rate of 80 miles an hour over a tangent between Nantasket Beach and Hull, Mass., last Saturday.

INDEX TO VOLUME LXXII

—OF THE—

Mining and Scientific Press

FROM JANUARY TO JUNE, 1896.

A

Acclimitization 482
Accumulation of Amalgam on Copper Plates ... 182
Acetylene 82, 109, 162, 188, 208, 378, 183
Adventures of a Mining Item 317
Aerodrome, Langley's 421
Agassiz, Alexander 192
Age of the Earth 128
*Air Compressors for Railway Use 266
Alameda's Electric Light Cost 318
Alaska Mines ... 31, 51, 151, 191, 210, 231, 251, 300, 322, 363, 403, 423, 447, 487, 527.
Allis, E. P. Co 306
Alloy to Solder Glass 419
All-'round Work 209
Alpine Co. Mines 503
Alumina from Clay 6, 318
Aluminum Solder 27
Aluminum Industry 126, 283, 318
Aluminum Electroplated with Copper 228
Amalgam, Accumulation of 182
Amador Co. Mines ..... 9, 30, 50, 70, 110, 150, 170, 190, 210, 230, 250, 270, 283, 300, 322, 342, 362, 402, 422, 446, 462, 466, 486, 510, 526.
American Steel Pool 482
American Electric Heating Co 294
Anaconda Mining Co 43
Annual Report Precious Metals '95 47
Antiquity of Mining 481
Anti-Debris Association ... 102, 122, 146, 202, 206, 210, 282, 355, 415.
Applications for Patents 163
Appropriation of $250 000 458
Appropriation, Argument for 225, 355
Arc Light, Why It Hisses 28
Argument for an Appropriation 225
Arizona's Mineral Output, '95 3
Arizona Mines ..... 11, 32, 51, 72, 91, 111, 132, 151, 171, 191, 210, 231, 251, 271, 301, 323, 343, 363, 383, 423, 447, 466, 448, 510, 527.
Around the World in 30 Days 421
Articles in This Paper 282
Art of Assaying 48
Assay of Gravels by Amalgamation and Blow Pipe 460
Assay of Silver Sulphides 265
Assays of Copper and Copper Matte ... 317, 339, 359
Assaying, The Art of 48
Assaying and Sampling 4
Assaying at Mines and Works in Colorado 224
Assessment Work 143, 503
Attachment to Traction Engines 48
Australasia's Gold Yield, '95 335
Austin, W. L 245
Australian Mines 52, 171, 271, 447, 488
Automatic Power Brakes 49

B

Ball Bearings in Crane Hooks 421
Balloon's Highest Flight 109
Ballooning to North Pole 484
*Banta & Wink Process 338
*Battleship Oregon 437
Beach, A. E 14
Bearing Metal, Formula for 6
Best Ore Mining Record 461
Big "Big Tree" 184
Blasting, New Method of 68
Bond Mine, Form for 354
Bonding Mines 354
Book, Largest and Smallest 189
*Borax Mines 181
Brain, Comparative Weight of 209
Broken Hill Proprietary 479
Broken Hill Proprietary Co.'s Report 161, 203
British Columbia Mines ... 10, 31, 51, 71, 91, 131, 151, 171, 191, 210, 231, 251, 270, 300, 322, 343, 362, 382, 403, 423, 447, 466, 487, 510, 527.
Budd, Gov 282
Butte Co. Mines ... 9, 50, 70, 90, 130, 170, 190, 201, 210, 230, 250, 270, 300, 322, 342, 362, 382, 402, 422, 446, 486, 510, 526.
Butte Miners' Union 395
Butters, H. A 401
Butterfield Tunnel 105

C

Cabinet Department, Proposed New 334
* Cable, Largest on the Coast 359
* Calaveras Co. Mother Lode 66
Calaveras Co. Mines ... 9, 30, 50, 70, 90, 110, 130, 150, 170, 190, 210, 230, 250, 270, 300, 322, 342, 362, 382, 402, 422, 446, 462, 466, 486, 510, 526.
* Calcic Carbide Plant, First ... 87, 109, 128, 188, 208, 378.
Calculagraph, The 28
* California Geysers 85
* California River Reclamation 333
* California Irrigation 45
* California Summer Scenery 481
* California Electric Mining Plant 313
California Tin 134
California Mines ..... Every Issue
California Miners' Association ... 62, 143, 163, 183, 202, 222, 355, 395, 438.
California and Colorado Gold Yield ... 2, 3, 22, 43
California Mines and Miners ... 336, 358, 383, 399, 416, 443, 485, 507.
California Produce, How Best Marketed 265
California Gold Mine Dividends 283
Cal. Appropriations in River and Harbor Bill ... 300, 438, 458, 459.
California the Leader in Gold 314, 478
California Placer Mines, Waste Products of ... 396
California River Mining Revival 134
California River Improvement 335, 395
California Appropriations, 54th Congress ... 395, 438
California Mines in London 414, 480
California Dividend Paying Mines 313
California Forest Waste 421
California State University 162
California Newspapers 201
California's Oldest Papers 209
California's Mineral Product, '92, '93, '94, '95 ... 315
California's Mineral Product for '95 374
California's Gold Yield for '95 322
California's Hydraulic Mines 22, 478
California's Gold Belt 146, 314, 478
California's Mining Possibilities 5, 314, 478
California's Lumber Yield, '96 401
California's Different Forms of Gold Mining ... 479
Calumet & Hecla 282
* Cam-Fastener, Reliance 186
Caminetti Act 438, 458
*Camp Floyd District, Utah 521
Canada's Mineral Yield, '95 335
Candle, A New Kind 525
Carbon in Different Foods 359
* Carborundum, Manufacture of 1
* Carson City G. and S. M. Co. vs. North Star M. Co. Decision 223, 241
Car Wheels on Track Curves 6
Care of Lamps 149
* Card Electric Motor Co 41, 201
Cartridge, New Safety 228
Cast Iron vs. Steel Pipe 421
Casey, Gen. T. L 249
Cascade Locks, Oregon 192

*Illustration.

PAGE.

Cathography 168, 187, 222
Cathography, Apparatus for 378
Central Lumber Co 112
Central Station Economics 188
Champion Drill Contest 283
Chemistry of Steam Raising 248
"Chemically Pure" 128
Chemistry, New of High Temperatures 88
Chemistry, Practical Progress in 318
Chemical "Theory of the Freedom of the Will" .. 89
Chemical Composition of a Man 378
Chemical Detective 309
* Chain Blocks 128
Chicago Mining Commissions 46
Chispa, The 504
Chlorination Process 25, 147
Chlorination Vs. Cyanide 318
Chlorate of Potash from Chlorine 319
Claim Holding Without Assessment Work 313
Claim, Forfeiture of 354, 374
Clark, C. Jefferson 152
* Coal Mine Electric Plant 483
Coal Production U. S. '95 415
Coal Imports San Francisco, '94, '95 54
* Coal Mines, Corral Hollow 161
Coalless Cities 27
Cold Drawn Process 247
Colorado Newspapers 404
Colorado, Assaying at Mines and Works in ... 224
Colorado Iron Works 143, 211, 317, 490
Colorado's "Boom" 23, 82
Colorado Miners' Wages 29
Colorado's Metal Output for '85 ..... 32, 395
Colorado Mines ... 32, 51, 71, 91, 111, 131, 151 171, 191, 210, 231, 251, 271, 301, 323, 343, 363, 383, 403, 423, 447, 466, 488, 510, 527.
Colorado Miners' New Protective Rules 63, 106
Compressed Air, Gunning With 188
Compressed Air 206
* Compressed Air in Railway Use 266
Comstock, Sunday Work on 162
Comstock Ore Sampling 164
Conscience a Troublesome 167
"Concentrates" ..... Every Issue
* Concentrator, New Ore 41
* Concentrator, Union 221
Confidence Will Win 6
Copper, Electrical Demand for 49
Copper and Copper Matte, Assays of 317, 339
Corrugated Glass, Effect of Using 148
* Cornish Crushing Rolls, Improved 317
Cost of Classification of Mineral Lands 458
Cotton Waste, Self-Ignition of 209
Country's Growth 525
Crawford, J. J 262
Cripple Creek Corporations 103
* Cripple Creek District 281
* Cripple Creek Gold Field 284
Cripple Creek Fire 355
* Crossings, Notes on 166
Crosscut Saw 168
Crookes' Tube 398
Crust of the Earth 502
Crystallization Under Vibration 461
Culm, Utilization of 88
* Cyanide Process at Mercur, Utah 418
Cyanide vs. Chlorination 318
Cyanide Process 25
Cyanide of Potassium for Hardening Steel 208

D

*Dam for Electric Power, Nevada Co 101
* Davis Crushing Rolls 205
Debris Commission ... 22, 34, 203, 223, 262, 283, 335, 355, 458, 479.
Decision Case of Walrath vs. Champion M. Co. .. 103
Decision Lien Claim for Labor 462
Deepest Shaft in Colorado 414
Deepest Vertical Shaft 142
Deepest Gold Mine 375
Depth of Lake Superior Mines 461
Del Norte Co. Mines 9, 150, 190, 322
Denver Engineering Works 211, 490
Derby, Chas. C 134
Devlin, R. T 62, 282
Diamond Shoal Lighthouse 27
Diploma from the Chicago Exposition 457
Diplomatic Mr. Grove 225
* Direct Connected Motor and Lathe 41
Dividends Paid by American Incorporated Companies in 1895 130
Dividends Paid in '96 .. 11, 74, 83, 211, 228, 258, 272, 310, 344, 364, 399, 507, 535.
"Divining Rods" 143
Doctor of Machinery 68
Dodd, W. G 221
Dog-in-the-Manger Policy 147
* Double Reel Direct Acting Hoisting Engine ... 490
Draughting Instrument, Improved 88
Drill Sharpening Machine 6
* Dry Placer Machine 107, 201
Dynamometers, Notes on 267
Dynamite, Its Use and Abuse 460

E

Earth, Age of 128
Eastern Mining Swindles 62
Edison's Experiments 27, 88, 169, 187, 378, 505
Edman, J. A 45, 337
El Dorado Co. Mines, 9, 30, 50, 70, 90, 110, 130, 150, 170, 190, 210, 230, 250, 270, 300, 322, 342, 362, 382, 402, 422, 446, 466, 486, 510, 526.
Electricity, An Exact Science 379
Electricity in Mariposa Co 109
Electricity Direct From Coal 27
Electricity in Mines 89
*Electricity in Mining 207
Electricity in Railroad Work 524
*Electric Mine Cage 441
*Electric Fan 461
*Electric Rock Drills 338
*Electric Plow 7
*Electric Power, Dam For in Nevada Co 101
*Electric Locomotive in Baltimore 226
*Electric Hoists 247
*Electric Power House, Largest 333
*Electric Welding Plant 313
*Electric Transmission, Sacramento-Folsom ... 413
*Electric Coal Mine Plant 483
*Electric Drill Press 127
*Electric Lathe 127
Electric Lamp, New 109
Electric Cementation of Steel 109
Electric Drilling Machine, Collet and Engleshard 525
Electric Elevated Railroads 88
Electric Motor, Range of Speed in 169
Electric Locomotive, Westinghouse 207
Electric Tree 394
Electric Welding 294
Electric Engineering, Success In 149
Electric St. Railway Chronograph 8
Electric Stevedore 27
Electric Light, First in Theater 28
Electric Light, Tesla's New 421
Electric St. Railway's Summarized Report 442
Electric Mine Plant at Silverton, Col 461
Electrical Apparatus, Large Shipment of 525
*Electrical Current Rectifier, New 187
*Electrical Engineering Co 313
*Electrical Sinking Pump 127
*Electrical Power, Application of 127
Electrical Cutting of Cloth 207
Electrical Induction, Lighting by 227
Electrical Fields, New 28
Electrical Exposition, New York 8
Electrical Current Action on Mine Survey Instruments 169
Electrical Power in Sacramento; Charges for .. 163
Electrical Demand for Copper 49
Electrical Reduction of Colorado Ores 68
Electrical Orchestra 318

PAGE.

Electrical Locomotive 129
*Elevator, Hydraulic Gravel 261
Endless Belt Conveyors 248
English Government Engineering Contracts ... 379
Engineers, A Chance for Young 49
Engineering Magazine 224, 252
Engineering Novelty in Cincinnati 294
Etching Wood 525
*Experience With the Electrical Locomotive in Baltimore 226
Extra Lateral Rights 103

F

Face Bath, Russian 525
Factories, Destructive Fires in 209
"Fad," Origin of Word 209
Fauvel Process 5
*Fastest Battleship 437
Federal Mining Laws 183
Fiddle Drill 168
Fog Horns 168
Fire, Invisible 506
Flame, A Study of 89
Fluorescent Lamp 505
Fly Wheels 443
Flying Machine, Lilienthal's 227
*Folsom Electric Transmission 414
Ford, T. L 62, 143, 225, 375, 381
Forfeiture of Claim 354, 374
Form for Mine Bond 354
Forest Protection From Fire 69
Fraser & Chalmers 370
Frauds in the Mining World 439
Fraudulent Oil Sales 484
Free Milling Practice, Improvements in 524
Fresno Co., Roads in 248
Fulton Engineering and Shipbuilding Works, 252, 363, 424, 462, 490.

G

Gas Engine Jackets, Incrustation in 229
Gas Engine Valves, Leaky 399
*Gasoline Engines 181
*Geared Locomotive 398
General Electric Co., 69, 126, 152, 207, 247, 306, 370, 461
Geological Maps 48, 142
Geological Survey Improved 393
Giant Powder 107
Giant Among Inventions 108
*Girard Wheel 313
Glass Alloy to Solder 419
Glass, How to Bore 217
Glass Houses 359
Glossary of Mining Terms 506, 528
Glucinium 28
Glue Joints in Belts 168
Gold Extraction Process 373, 414
Gold Imports and Exports 375
Gold Milling in Cal., 4, 24, 46, 64, 108, 125, 144, 165, 186, 206.
Gold Mining Exchange 22, 223, 243, 283
Gold Mining in Rhodesia 244
Gold Product of U. S. '95 ..... 29, 43, 142
Gold Product California '95 ..... 43, 314, 322
Gold Product Colorado '95 43
Gold, World's Greatest Lode 184, 314, 480
Gold in Black Sand 262
"Gold Is Where You Find It" Paraphrased 317
Gold Yield of Cal. by Counties 95
Gold Field, Greatest 478, 480
Gold Dredging in Cal. Rivers 479
Gold Lode, World's Greatest 480
Gold Dredging in New Zealand 504
Gold Ore, Low Grade Profitable 503
Govt. Eng. Contracts in England 379
*Gravel Elevator, Hydraulic 261
Greatest Gold Field 478
Green Wood, Moisture in 398
*Greenstone Outcrop 457
Gun Manufacture 109
Guns, Horse Power of 208

H

H. P. of a Boiler 229
H. P. of Water Supply 503
Hale & Norcross Labor Trouble 223, 243
Hale & Norcross Decision 394
*Hallidie, A. S 81, 212
Hammond, Jno. Hays, 42, 43, 143, 243, 304, 364, 395, 426, 439, 459 479.
Handling Material in Shops 174
*Harrison Conveyor Coal Screen 292
Hardening Steel 148
Harvey, W. P 25
Have We Too Many Electricians ? 49
Heat in the Earth's Crust 502
Hecla Con. Mining Co 183
*Heisler Locomotive 398
Helium 442
*Hendy Machine Works 41, 261, 357
*Hoisting Engines, Largest 373
Hoisting Machinery, New 524
*Homestake Mills 105
Horse Power, Unit of 162, 229
Horseless Carriages 228
Horseless Mail Wagons 249
Humboldt Co. Mines 9
Hydraulic Mining Legislation 102, 355
*Hydraulic Gravel Elevator 261
*Hydraulic Giant, Improved Form 357

I

Ice in Low Latitudes 317
Idaho Mines, 10, 31, 51, 71, 91, 111, 151, 171, 191, 210, 231, 251, 271, 300, 322, 343, 363, 382, 403, 423, 447, 466, 488, 510, 527.
Idaho Mineral Land Commission 283
Illimitable Space 379
Improved Geological Survey 393
Index to Volume LXXI 12
Increase and Decrease of California Counties' Gold Yield 95, 322
Incrustation, Boiler, Chromate for Preventing .. 525
Incrustation in Gas Engine Jackets 229
Influence of Position in Sleep 379
Inspection and Testing of Materials 109
Internal Heat of Mines 146
"Invention"—The Indefinable Requirement of the Patent Law 264, 286
Inyo Co. Mines, 30, 90, 150, 190, 230, 362, 402, 422, 486, 510.
*Iron Work, Ornamental 6
*Irrigation in California 45

J

Jackson, Byron 21
Japanese Wages 207
Jefferds, M. R 232
*Jeffrey Roller Chain Conveyor 292
*"Johannesburg of America" 528
Journalistic Suspension 62

K

Kelvin, Lord 390
Kern Co. Mines, 31, 300, 342, 362, 382, 402, 446, 466, 486, 510
Kiel Canal, Cost of 228
*Kinkead Waste Rock Experiment 61
Kirby, Ed. B 14

L

Labor, Comparative Cost of 525
Labor and Time, Waste of 85
Lake Superior Mines 461
Lake Co. Mines 270
Lang, Herbert 232, 417
Largest Store in U. S 192
*Largest Hoisting Engines in the World 373
Largest Railway Systems 399
Largest Circulation 438
Largest Blast Ever Made 462
Lassen Co. Mines 9, 300, 402, 526
Lead, Tariff on 262
Lead Statistics '95 ..... 317, 442

PAGE.

Leak, A Big 148
Leaky Gas Engine Valves 399
Leffel, Jas. & Co 152
Legal Decisions, Recent 29
Lien Upon a Mining Claim 462
Life Preserver, Novel 379
Light, Modern Theory of 482, 504
Light by Electrical Induction 227
List of California Mines, 336, 358, 383, 399, 416, 443, 485, 507.
Lithium 320
Lixiviation of Silver Ore in Mexico 316
Locks, Half Cent Each 129
*Locomotive, Electric, in Baltimore 226
Logs, How to Compute Contents of 462
London Stock Exchange Report 415
Longitudinal Waves and Roentgen Rays, 207, 222, 290.
Lorandite, the New Mineral 68
Los Angeles Co. Mines 9, 270
Low Grade Ore, Treatment of 44
Lower Californian Mines, 72, 91, 210, 323, 363, 383, 403, 466, 511.

M

MacArthur-Forrest Process 203, 418
Machinery, Importance of Rightly Packing 320
Machine Telegraphy 294
*Machine for Road Making 393
Madera Co. Mines 90, 210, 300, 402
Magnesite 146, 437
Magnetic Survey, French 228
Magnetic Separator, Edison's 88
Magnifying Power 69
Manufacturers' and Producers' Association, 62, 94, 122, 134, 252, 354, 364, 381.
Manganese Ore Product '93, '94 69
Manganin 188
Marin Co. Mines 526
Mariposa Co. Mines, 9, 50, 90, 150, 170, 190, 230, 250, 270, 300, 322, 342, 382, 422, 446, 466, 486, 510, 526.
Market Reports ..... Every Issue
Matte Smelting 232, 398
Matte Smelting (Lang) 417
Matte Smelting (Austin) 245, 282, 356, 376, 440
Mattes and Slags, Handling of 246
Maxim, H. S 271
McKinley's Record on Silver 522
Mechanics' Institute, Twenty-ninth Exposition. 147
Mechanics' Institute 354
Mein, Thos 381, 445
Mendell, G. H 172
Merced G. & M. Co 283, 414, 415, 422
*Mercur's Cyanide Mill 418
*Mercur, Utah 521
Mercur, Utah, Country Rock of 335
Metals, Precious, Annual Report 47
Metal Compounds 174
Metal, Fusible Composition 188
Metallic Precipitation, Unusual 229
Metric System 224
Methods of British Mining Purchasers 225
Mexican Mines, 51, 91, 132, 151, 363, 383, 403, 423, 447, 466, 488.
Mexican Industries 394
Michigan Mines 11, 32, 51, 124, 132, 210, 301, 527
Microscope as Used in Mining 337
Mica, Mining of 205
Milling in Miniature 65
Million, How to Make 5
*Mine Plant, Electrical 483
Mine Floating in London 5
Mine Owners and Supts. in Cal., Names of, 336, 358, 383, 399, 416, 443, 485, 507.
Mineral Product of State for '95 374
Mineral and Metal Production, U. S 95, 335
Mineral Land Legislation, 83, 102, 122, 142, 161, 162, 183, 202, 206, 222, 223, 282, 283, 300, 335, 354, 375, 394, 415, 438, 458, 459, 479.
Mineral Collection, State Mining Bureau ... 206, 271
Mines, Miners and Monopolies, 45, 64, 84, 104, 124, 167
Mines in Cal., List of, 336, 358, 383, 399, 416, 443, 485, 507.
Mines Form for Bond 354
Miners' Safety Hat 418
Miners' Union, Virginia, Nev 233
Mining Recognized in Party Platform 375
Mining Fraud, A 335
Mining Bureau, Usefulness of, 245, 262, 334, 459, 504
Mining Titles on Spanish Grants in the U. S., 185
Mining Journals, New 375
Mining Statistics 162
Mining Terms, Glossary of 506
Mining Engineer, The Training of 86
Mining Schools, Aid for State 262
Mining Manual Needed for the Neophyte 308
Mining in Cal. Rivers 334
Mining Summary ..... Every Issue
Mining Share Markets ..... Every Issue
Mining Shareholders' Directory ..... Every Issue
Mining Legislation in 54th Congress, 22, 82, 102, 122, 142, 163, 183, 202, 206, 222, 223, 262, 335, 354, 355, 375, 394, 415, 438, 439, 458, 479.
Mining Companies Newly Organized, 32, 74, 94, 112, 134, 211, 258, 271, 272, 324, 363, 390, 462, 494, 507, 533.
Mining Papers, New 63
Mining Laws, Proposed Change in .. 82, 222, 335, 438
Mining Assessments 83, 143, 503
Mining Stocks, Sale of 222
Mining Claim Lien 462
*Mining Hoist Engines, Largest 373
Minnesota Mines 91, 132
Missouri Mines 11
Mobility of Metals 312
Monazite Industry 247
*Modoc and Aztec Engines 373, 377
Modoc Mines 9
Modern Theory of Light 482
Montana's Mining Disasters 313
Montana's Mineral Product, '95 243
Montana Mines, 10, 31, 51, 71, 91, 111, 131, 171, 191, 210, 231, 251, 271, 301, 322, 343, 363, 383, 403, 423, 447, 466, 488, 510, 527.
Montana Mineral Land Commission 283, 315
Montana Mining Law 42, 395
Montana Mining Co 223
Mono Co. Mines, 9, 50, 90, 170, 190, 210, 270, 332, 402, 422, 526.
*Mother Lode, Map of, in Calaveras Co 66
Mother Lode 90, 146, 184
*Motor and Lathe Direct Connected 41
*Multipolar Slow Speed Generator 201

N

Nails in Wood 129
Napa Co. Mines 130, 250, 270, 526
Native Labor in South African Gold Mines 47
Naval Training School 438
Nevada as a Gold Producer 522
Nevada State Mines, 10, 31, 51, 71, 91, 111, 131, 150, 171, 191, 210, 230, 250, 270, 300, 322, 343, 362, 382, 402, 422, 447, 466, 487, 510, 527.
Needs of a Smelter 282
Nerve Points Influenced 108
*Nevada Electric Power Co.'s Dam 101
Nevada Co. Mines, 9, 26, 30, 50, 67, 71, 90, 110, 130, 150, 170, 190, 210, 230, 250, 270, 300, 322, 342, 362, 382, 402, 422, 446, 466, 486, 510, 526.
New Jersey Mines 52
New South Wales Rainfall 88
New Mexico Mines, 11, 32, 50, 71, 91, 111, 131, 171, 231, 251, 271, 301, 323, 343, 383, 423, 447, 488, 527.
New South Wales Mines 343
New Zealand Mines 488
Newfoundland Mines 132
Niagara Falls' Roar Heard in N. Y. City 422
Nickel Mines of Ontario 83
Norbom, J. O 41
*North Star M. Co., Decision Case, Carson City G. & S. M. Co 223, 241
Northern Pacific Railroad 212
Northwestern Miners' Association 43
*North Star M. Co. Decision 241
Not "Fashionable" in London 414

PAGE.

Notes on Dynamometers . . . 267
Notes on Gold Milling in California, 1, 24, 46, 64, 108, 125, 144, 165, 186, 206
*Notes on Crossings . . . 167
Notes on Handling of Slags and Mattes . . . 246
Nuts on Wagon Axles . . . 174

O

Oil Tank Steamer . . . 54
Orange Co. Mines . . . 9
Ore Business on the Lakes . . . 144
Ore Carriers on the Great Lakes . . . 161
Ore Mining Record, Best . . . 161
Ore Imports, Case Appealed . . . 342
Ore, Low Grade, Treatment of . . . 247
Ore Testing . . . 145
*Oregon Battleship . . . 205, 337
Ore Treatment . . . 215, 44, 52
Oregon Improvement Co . . . 560
Oregon Miners' Association . . . 163
Oregon Lieu Lands . . . 263
Oregon Mines, 10, 31, 51, 71, 91, 110, 121, 131, 151, 171, 190, 210, 230, 250, 270, 300, 322, 343, 362, 382, 402, 422, 447, 466, 487, 510, 527
Oregon's Bullion Yield '95 . . . 375
Ozone as an Industrial Agent . . . 247, 283

P

Panton, Design of Cruiser . . . 260
Paper Pulp . . . 174
Paraffine Paint Co . . . 104
Patents Issued in '95 . . . 184
Patents, Notices of, 19, 39, 59, 72, 99, 114, 134, 150, 170, 190, 212, 232, 250, 321, 341, 361, 384, 404, 428, 448, 490, 510
Patent Law, Indefinable Requirement of . . . 264, 286
Patent Commissioner's Report . . . 142
Patio Process . . . 182
Pelton Water Wheel Co . . . 102, 112, 172, 300, 363
Petroleum, No. Bbls. Produced in U. S. in '93-94 . . . 65
Petroleum in California . . . 172
Petroleum, Joints Tight . . . 308
Phonograph in Watch . . . 308
Photometry . . . 268
Photography, The New . . . 82
Photographing Through Opaque Bodies With Ordinary Light . . . 188
Pitting in Steam Boilers . . . 49
Placer Co. Mines, 9, 50, 90, 110, 130, 170, 190, 210, 230, 250, 270, 300, 322, 402, 422, 446, 466, 487, 510, 526
Placer Mining on a Small Scale . . . 315
Placer Mining in California, Waste Products of . . . 395
Plumas Co. Mines, 9, 70, 90, 110, 150, 190, 230, 250, 300, 322, 342, 382, 446, 466, 487, 510, 526.
Plumas Co. Rainfall . . . 87
*Portable Electric Hoists . . . 247
Postoffice Address of California Mine Owners and Superintendents, 336, 358, 383, 399, 416, 443, 485, 507.
Powder Giant . . . 107
*Power House, Largest Electric . . . 353
Practical Experience With Patio Process . . . 382
Pratt, N. W . . . 249
Presses Succeeding Hammers . . . 148
Preserving Small Skins . . . 443
Prices, Effect Upon of Improved Methods . . . 148
Printers' Ink . . . 82
Prisons of Siberia . . . 308
Private Mining Corporations . . . 503
Process, Gold Extraction . . . 373
Prospector, Book for . . . 101
Prospectors' Assay Outfit . . . 460
Providence vs. Champion . . . 334
Pumice Stone Deposits . . . 83
*Pumping Machinery . . . 333

Q

Quicksilver, Yield '95 . . . 43

R

*Raeycle Crank Hanger . . . 267
Railway Systems, Largest . . . 399
Rawhide Gearing . . . 421
Raymond, R. W . . . 185
Real and Unreal Business Paper . . . 319
Recorder, County Liability of . . . 374
Recuperative Power of the American Miner . . . 63
*Reeds' Dry Placer Machine . . . 201
*Relay Water Wheel Governor . . . 501
*Replogle Governor Works . . . 501
Revealing Hidden Solids . . . 148
Reversal in Invention . . . 68
Revival of River Mining . . . 334
Rhodes, Cecil . . . 34
Rickard, T. A . . . 283
Rideout, N. A . . . 212
Rigaud's Gold Process . . . 393, 414, 437, 459
Risdon Iron Works . . . 463
*River Reclamation in California . . . 333
River Improvement . . . 2, 42
River Mining, Present and Future . . . 419
Riverside Co. Mines, 9, 50, 110, 130, 150, 190, 210, 230, 270, 342, 382, 402, 447, 487.
*Roadmaking Machine . . . 303
Robinson G. M. Co.'s Report (S. A.) . . . 335, 439
Roentgen Rays, 142, 148, 168, 187, 188, 207, 208, 222, 227, 247, 268, 290, 294, 396, 524.
Rope and Belt Transmission of Power . . . 484
*Ropeway at Empire Nevada . . . 141
Ropp Furnace, A Correction . . . 396
Rothwell, J. E . . . 25
Rulings of Secretary of Interior . . . 2
Russia's Mineral Output, '95 . . . 3
*Rustic Bridge . . . 65

S

*Sacramento-Folsom Electric Transmission . . . 413
Sacramento River Improvement . . . 262
Sacramento Co. Mines . . . 342, 487
Sails, Perforating for Speed . . . 524
San Bernardino Co. Mines . . . 50, 130, 170, 230, 250, 270, 342, 362, 382, 402, 422, 466, 487, 510, 526.
San Benito Co. Mines . . . 210
San Diego Co. Mines . . . 9, 31, 50, 70, 110, 130, 150, 170, 225, 230, 250, 270, 300, 322, 342, 362, 402, 422, 446, 487, 526.
Santa Barbara Co. Mines . . . 362, 526
Salamander, A Human . . . 167
Salt Storm . . . 120
Salt Lake & Ogden Railway Co . . . 247
*Scenery in California . . . 481
Schools of Mines . . . 62
Scientific Activity, Present . . . 208
Seattle, Washington, Water Supply of . . . 26
Secretary of Mines Wanted . . . 457
Selling Mines . . . 357
Shasta Co. Mines . . . 9, 30, 50, 70, 90, 110, 130, 150, 170, 190, 210, 230, 250, 270, 300, 322, 342, 362, 382, 402, 422, 446, 466, 487, 510, 526.
Shot, Longest Distance Fired . . . 188, 419
Siam Mines . . . 92
*Siemens & Halske Electric Drills . . . 338
*Siemens Halske Co . . . 127
Sierra Co. Mines . . . 9, 91, 111, 130, 150, 170, 190, 210, 230, 250, 322, 382, 402, 422, 446, 466, 526.
Silver from Silver Bromide . . . 6
Silver, Increased Demand for . . . 522
Silver Mines a Good Investment . . . 147
Silver Product U. S. '95 . . . 29
Silver in Politics . . . 502
Silver Coinage, Resumption of . . . 98
Silver Sulphides, Assay of . . . 265
Silver Chloride in Roasted Ore, Effect of Washing Upon . . . 204, 396
Silver, Cost of Production . . . 223
Silver Prices Now . . . 283
Silver Ore Lixiviation in Mexico . . . 316
Silver Situation . . . 477
*Single-Valve Cross Compound Engine . . . 21
Siskiyou Co. Mines . . . 9, 30, 50, 70, 91, 111, 122, 130, 150, 170, 190, 210, 230, 250, 270, 300, 322, 342, 362, 382, 402, 422, 446, 466, 487, 510, 526.
Solar Energy, Theories on . . . 357
Soldering Glass . . . 148
Smythe, W. H . . . 264

PAGE

Smelting Tin in Singapore . . . 484
Smelter Projects . . . 282
Solar Heat Power from . . . 524
Some Mill Records . . . 110
Sonoma Co. Mines . . . 111
Sonntag, Julian . . . 304, 450
South African Trade . . . 304
South African Gold Output . . . 3
South African Mines . . . 11, 30, 123, 171, 183, 251, 274, 283, 301, 344, 383, 403, 423, 447, 466, 506, 512
South African Mine Balance Sheet . . . 26
South African Mining Law . . . 83
South American Mines . . . 211, 494
South African Mining and Political Troubles . . . 223
South African Mine Star Salaries . . . 315
South Dakota Mines . . . 3, 11, 31, 51, 91, 151, 210, 241, 271, 301, 324, 363, 382, 403, 447, 466, 488
Split Factory . . . 339
Spring Valley Mine Decision . . . 262
Stamps, Number in Present Operation in California . . . 315
Starr, Geo . . . 283
Stealing Inventions of Others . . . 290
Steam, Why It Fuses Soft Plugs . . . 339
Steam, Raising, Chemistry of . . . 248
Steam Locomotives Without Fireboxes . . . 228
Steam Boilers, Equipment, Etc . . . 505
Steam and Electricity . . . 127
Steamship Evolution . . . 308
Steel Wagon Roads . . . 248
Steel Rails, Life of . . . 27
Steel, Burnt . . . 28
Steel and Cast Iron Pipe . . . 121
Steel Worked by a New Process . . . 484
Steel Tubing . . . 484
Stellar System, Latest . . . 227
Stetefeldt, C. A . . . 282
Stoech, Dr. I. B . . . 17
Storage Battery Traction . . . 187
Strassenbahnwagenuntergestelle . . . 308
Sulphur, How Mined . . . 229
Superintendents of California Mines, Postoffice Address of . . . 336, 358, 383, 399, 416, 443, 485
Supreme Court Decision, Providence vs. Champion . . . 334
Supreme Court Decision, Co. Recorder . . . 374
Survey, Geological . . . 303
Sylvanite . . . 163, 305

T

Tailings, Worked Over . . . 282
Tall Buildings in San Francisco . . . 243
Taxing Unpatented Mining Claims . . . 355
Taylor & Co., Jno . . . 192
Telegraphing Through Space . . . 204
Telegraphy, Most Rapid . . . 87
Telegraph of Twentieth Century . . . 8
Telephone Weather Bulletins . . . 49, 68
Telephone Construction in Mountains . . . 350
Tellurium, Hints in Regard to . . . 48
Tellurium Separation from Copper Residue . . . 289
Telluride . . . 83
Temperature, Internal of Rocks . . . 120
Temperature, Variations of . . . 174
Temperature, Lowest When Hot Body Visible . . . 309
Tesla, Nikola . . . 169, 204, 421
Theory of Light . . . 482, 504, 524
Thermometer, A New . . . 89
Thirty-six Years Old . . . 414
Thurber, H. K . . . 313
Tibbits, J. H . . . 134, 364
Timber Preservation . . . 442
*Tin Smelting in Singapore . . . 484
Tornedo, A Novel Target-Seeking . . . 525
Traction Engine, Attachment to . . . 48
"Tramp Corporations" . . . 83
Trans-Siberian Railway . . . 49
Transmission of Power by Belt and Rope . . . 484
*Transporting Mining Machinery . . . 121
Training of a Mining Engineer . . . 86
Treasury Department Rulings . . . 21, 122, 315
Treadwell, G. A . . . 315
Trinity Co. Mines . . . 9, 31, 50, 70, 111, 122, 131, 150, 170, 190, 230, 250, 270, 300, 322, 342, 362, 382, 446, 466, 487, 527.
Tsetse Fly . . . 421
Tuolumne Co. Mines . . . 31, 91, 111, 131, 150, 170, 190, 210, 230, 250, 270, 322, 342, 362, 332, 402, 422, 446, 487, 510, 527.
Tunnel, The Butterfield . . . 105
Tunnels, Cost of Four Greatest . . . 188
Turbines at Niagara . . . 248
Twentieth Century, When Begun . . . 29
Type Setting, Greatest Record . . . 285

U

Union Iron Works . . . 143, 192, 373, *437
*Union Gas Engine Co . . . 181
*Union Ore Concentrator . . . 221
Unpatented Mining Claim, Taxes on . . . 42
Use and Abuse of Dynamite . . . 460
Utah's Mining Law . . . 459
Utah's Mineral Output '95 . . . 3
Utah Mines . . . 10, 32, 51, 71, 91, 111, 121, 151, 171, 191, 210, 231, 251, 271, 300, 322, 343, 363, 382, 423, 447, 466, 510, 527.
Utica Mine . . . 223
Utilizing Scorchers . . . 148

V

Vacuum-Type System Electric Lighting . . . 438
Valentine, Jno. J . . . 47
Values of Foreign Coins . . . 67
Visionary Scheme . . . 129
Vitalistic Theory of Matter . . . 267
Venezuela, Industry, Mining and Commerce of . . . 47
Venezuela Mines . . . 132
Venezuela's Title . . . 145
*Vulcan Ropeway . . . 141
Vulcan Iron Works Fire . . . 101

W

Wages in Different States . . . 45
Wanted, a Sec'y of Mines . . . 457
Washington State Miners . . . 202
Washington's Assessed Valuation . . . 252
Washington Mines . . . 10, 31, 91, 111, 151, 171, 191, 230, 250, 300, 322, 343, 362, 402, 422, 447, 466, 487.
*Washburn-Moen Mfg Co . . . 359, 424
Washing with Water Silver Chloride in Roasted Ore . . . 204, 396
Wasted Sun Force . . . 149
Waste Products of Placer Mining in California . . . 396
Water, to Purify . . . 524
*Water Wheel Governor . . . 501
Water, Methods of Procuring . . . 484
Water-Tube Boilers for War Ships . . . 249
Waterloo Mining Co. Litigation . . . 333
*Watchman's Clock . . . 265
Waves Deep Sea, Height of . . . 188
*Wire Ropeway at Nelson, B. C . . . 81
Wells-Fargo Treasure Reports . . . 23
Welsh Tin Makers . . . 482
Welding by Electricity . . . 204
Western Federation of Miners . . . 415
Westinghouse Electric and Mfg Co . . . 69, 112, 134, 152, 207, 306.
Wind Measured by Its Sound . . . 247
Wiring the Sahara . . . 189
Witwatersrand Dist., S. A., Gold Yield '95 . . . 403
*Wood's Dry Placer Machine . . . 107
World's Greatest Gold Field . . . 67
Wright, Jno. M . . . 11
Worlds Will Cease to Revolve . . . 379
World's Greatest Gold Lode . . . 184
Wyoming Mines . . . 71, 151, 171, 271, 322, 343, 363, 423, 447, 510, 527.

Y

Yale, C. G . . . 63, 335
Yuba Co. Mines . . . 170, 230, 270, 300, 343, 362, 402, 487
Yuma, Mines Tributary to . . . 225

Z

Zinc Product U. S. '95 . . . 223

CALIFORNIA MINES AND MINERS.

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from issue of June 20th.

PLUMAS COUNTY—Continued.

NAME OF MINE.	Character of Mine.	No. of Men Employed.	Location	Name of Superintendent or Agent	Address
Swiss No. 2 Mine	Gold quartz	2	11 m W of Prattville	B. Piazzoni, Owner	Butte Valley
Swiss Claim	"	1	11 m W of Prattville	B. Piazzoni, Own	Butte Valley
Sunnyside Mine	"	10	2 m S W of Butte Valley	P. Peterson, Supt	Butte Valley
Soda Bar and Eclipse	"	5	9 m SW of Crescent Mills	W. Edwards, and C. W. Cooksey	Quincy, Taylorville
Senator Perkins	"	2	5 m N E of Merrimac	Blazel, Own	Oakland
Silver Star	"	....	1½ m W of Spanish Ranch	Taylor Bros., Own	Spanish Ranch
Shenandoah	"	1	½ m N W Spanish Ranch	S. H. King, Supt	Spanish Ranch
Teige	"	2	3 m N W of Genesee	H. Teige, Own	Reno, Nev.
Tefft	"	5	18 m S E of Quincy	W. D. Vincey, Supt	Cromberg
Tucker & Brown	"	3	2 m W of Spanish Ranch	Tucker & Brown, Own	Spanish Ranch
Workman Mine	"	2	5 m N E of Merrimac	W. B. Harlon, Own	Merrimac
Yankee Bar	"	2	4 m S E of Butte Valley	S. Deane, Own	Butte Valley
Yellow Creek	"	2	18 m W of Spanish Ranch	S. P. Maxwell, Own	Spanish Ranch
Yet Lee	"	11	2 m W of South Rich Bar	Chinese Co	

SACRAMENTO COUNTY.

Addison	Gold	4	Folsom	— Addison; Leased to Chinese.	Folsom
Buckeye Flat	"	3	2½ m from Folsom	P. O'Neil, Supt	Folsom
Blue Ravine	"	7	4 m N E of Folsom	E. P. Jackson, Supt	Folsom
Capital Sewer Pipe Works		9	Sacramento	Geo. Maddox, Owner	Sacramento
Donnelly	Gold.	6	1½ m S E of Folsom	Ah Cum; Leased to Chinese	
Eckardt	"	6	3 m S E of Folsom	P. D. Eckardt; Leased to Chinese	Folsom
Elk Grove Well	Water.	1	Elk Grove	W. E. Everson	Elk Grove
Galt Water Works Well	"	....	Galt Station	B. M. Wizel, Own	Galt
Humbug Hill	Gold.	1	Near Folsom	Chinese Co.; Leased to Chinese.	
Kreuzberger & Co	Bricks.	24	Sacramento	Kreuzberger & Harvey, Own.	Sacramento
Lake Shore	Gold.	11	Near Folsom	W. H. Burke	Folsom
Lauson & White	"	2	Near Folsom	Lauson & White	Folsom
Maben & Nickerson	"	2	Folsom	Maben & Nickerson; (A Prospect)	
Mahoney & Keefe	"	6	Near Folsom	Mahoney & Keefe	Folsom
Maben & Nickerson	Shaft	2	Near Folsom	Maben & Nickerson	Folsom
Michigan Bar	Gold.	14	Near Ione	D. R. Thomas	Michigan Bar
McCue	"	6	Folsom	McCue & Bates	Folsom
Orange Vale	Irrigation.	1	6 m S of Roseville	E. C. Bedell, Supt	Orange Vale
Perry	Gold.	4	3 m S E of Folsom	Frank Perry & Co	Folsom
Rebel Hill	"	6	3½ m S of Folsom	Frank & Rogers, Own. Frank Perry, Supt.	Folsom
Rogers	"	6	2½ m S W of Folsom	A. Rogers	Folsom
Rollins	"	4	3 m S of Folsom	R. J. Rollins	Folsom
Riverside Brick Yard	Bricks	160	5 m S of Sacramento	J. O'Heel, Supt	Sacramento
Sulky Flat	Gold.	10	1½ m S W of Folsom	Chinese Co.; Ah Cum, Supt.	Mine
Salvador	"	4	3 m S of Folsom	— Salvador	Folsom
Sacramento National Gas and Water Co.			Sacramento	J. Bassett, Supt	Sacramento
White, Donnelly & Cooney	Gold.	3	Near Folsom	White, Donnelly & Cooney, Own.	Folsom
Willow Spring Hill	"	5	Near Folsom	Robt. Keefe	Folsom
White & Donnelly	"	23	Folsom	W. H. Black	Folsom

SAN BERNARDINO COUNTY.

Borax Mine	Borax.	60	5 m E of Calico	Pacific Coast Borax Co.; J. W. S. Perry, Supt	San Bernardino
Boomerang	Gold.	4	½ m S of Vanderbilt	Geo. Nay, Supt	Vanderbilt
Brick Mine	"		½ m S of Vanderbilt	Geo. Nay, Supt	Vanderbilt
Copper Bullion	Copp'r.	1	½ m W of Manvel	W. G. Bickson, Owner	Manvel
Carbonate	Lead & silver.	4	½ m S of Oro Grande	H. Robinson, Supt	Oro Grande
Climax (5 claims)	Gold.	2	3 m N W of Barstow	J. M. Beckwith et al, Ow	Calico
Courtwright	"	3	15 m S of Danby	Courtwright & McDonald, Own.	
Duncan & Clark	Lead & silver.	3	6 m N W of Barstow	Duncan & Clarke, Own	Barstow
Golden Eagle	Gold.		3 m S W of Vanderbilt	Chas. Smithson, Own	Vanderbilt
Gold Bar	"		Vanderbilt	Geo. Nay, Supt	Vanderbilt
Gold Bronze	"		Vanderbilt	J. K. Patten et al, Ow	Vanderbilt
Golden Queen	"	8	20 m N of Fenner	Thos. Keane, Supt	Fenner
Hidden Treasure	"	5	20 m N of Fenner	Thos. Keane, Supt	Fenner
Hong Kong	"		2 m N of Vanderbilt	A. A. Banning, Own.	Vanderbilt
Ibex	"	4	11 m N W of Needles	C. A. Mariner, Supt	Los Angeles
Iron Mine	"		½ m S of Vanderbilt	Geo. Nay, Supt	Vanderbilt
Langtry	Silver.		5 m W of Calico	T. N. Stebbins, Own.	Daggett
McFarland	Gold.		12 m N E of Blake	W. McFarland, Own	Vanderbilt
Nonpariel	Gold & copper.		12 m N E of Blake	Cram & Miller, Own	Vanderbilt
Needles Red'n Works			Needles	Needles Red'n Co., Own	Needles
Odessa Group	Silver.		1 m N E of Calico	J. M. Beckwith, Supt.	Calico
Occidental Group	"	31	1½ m N E of Calico	J. M. Beckwith, Supt.	Calico
Oriental Mines	"	37	At Calico	J. M. Beckwith, Supt.	Calico
Old Dominion	Gold.		12 m N E of Blake	Cram & Miller, Own	Vanderbilt
Oro del Fino	"		Vanderbilt	Geo. Nay, Supt	Vanderbilt
Orphan Boy	Gold & copper.		12 m N E of Blake	Cram & Miller, Own	Vanderbilt
Queen of Night	Gold	5	Vanderbilt	J. K. Patten, Lessee	Vanderbilt
Red Cloud	"		Near Manvel	Robt. Young, Own	Manvel
Silver King Group	"		Calico	W. H. Hardy, Agent	Daggett
Waterloo	"		2½ m W of Calico	W. H. Hardy, Agent	Daggett
Webster	"		½ m S of Vanderbilt	Geo. Nay, Supt.	Vanderbilt
Winton Group	"	6	7 m S E of Danby	E. Kennedy, Supt	Pasadena
Young	Copp'r.		5 m above Auberry	Robert Young, Own	Manvel

SAN LUIS OBISPO COUNTY.

Black Hawk	Quicksilver	1	Mouth Caspojoro Creek	John Secombe	San Simeon
Granite	Quarry		Near San Luis Obispo	Chas. Lee	San Luis Obispo
Jordan's Bit'n Quarry	Bitumen.	14	9 m S of San Luis Obispo	E. A. Crossman	Edna P. O.
King David	Gold.	4	15 m E of San Luis Obispo	John Mason	La Panza P. O.
Kepler's Quarry	Onyx.	4	16 m N E of Arroyo Grande	J. & F. Kepler, Owner	S. F.
Morrow	Quarry	2			
Newsom's Warm Spgs	Miner'l water.		2½ m E of Arroyo Grande	D. F. Newsom	Arroyo Grande
Pat Moore's	Quarry		5 m S of Arroyo Grande	Pat Moore	Arroyo Grande
Sycamore Springs	Sulph'r	2	7½ m S W San Luis Obispo	Alfred Walker, Own	Root P. O.
San Luis Obispo Co.	Quarry	10	7 m S of San Luis Obispo	Jas. Cormack	Edna
Tar Springs	Asp'lt.		9 m E of Arroyo Grande	T. W. Johnson	Los Angeles

SANTA CRUZ COUNTY.

Baldwin Mine	Bitu'm rock.		5 m W of Santa Cruz	L. K. Baldwin, Owner	
Cowell Quarry	Lime.	145	2 m NW of Santa Cruz	E. V. Cowell, Supt.	Santa Cruz
Cowell Quarry	Bitu'm rock.	25	11 m NW of Santa Cruz	E. V. Cowell, Supt.	Santa Cruz
Consolidated Bituminous Rock Co	"		12 m NW of Santa Cruz	F. C. Lewis, Sec'y	Phelan Bldg., S. F.
Camp Goodall Arte'n.	Water.		Near Watsonville	Goodall Perkins Own	S. F.

—* Begun in issue of April 25, '96. (To Be Continued.)

Mining Summary.

CALIFORNIA.

Amador.

The Amador Queen No. 2 has been bonded by E. H. Gould for $25,000 from Dr. Bardue. Sixteen men have been put to work in enlarging the mill in Hunt's gulch.

Butte.

The Big Bend mine is to be again worked under the foremanship of H. Turner. The water will be run through the two-mile tunnel, and it is expected that twelve miles of the bed of the Feather river will be laid bare.

Considerable work is being done at the Golden Feather. A twenty-ton iron boom and derrick was put in place this week.

Mercury: George H. Evans of the Banner, and other syndicate mines in the vicinity has assumed the management of the Wilson mine on the Magalia ridge, and will use the machinery of the Butterfly mine for working the Wilson. The Magalia ridge will soon be tunneled into as effectively as was the bluff in Oroville in '56, with prospects of good pay.

At the Magalia mine the water in the old works has been pumped out and the mine is now ready for working. In approaching the old works from the new shaft, drills with 10-foot shafts were used, and, when the water was struck, the wall of solid rock between the old and new works was sufficient to hold it in check, except as it escaped through the drill holes. This caution was necessary in order to prevent accident from flooding the new works. The channel can now be reached from the old incline tunnel, or from the shaft just completed, and, with the aid of proper machinery, can be successfully worked.

Calaveras.

D. R. Prince is in this city negotiating the sale to Englishmen of the Prince group of mines.

San Andreas *Prospect*: Machinery has been ordered for the Esmeralda mine. Preparations are being made to open up the Grace mine near El Dorado. The Marshall mine has begun active operations. The mill at the Donnellan mine is kept busy crushing on good rock. Thirty men are employed at the Martin gravel mine, near Sheep Ranch. Prospect work on the Shenandoah mine is being vigorously carried on. A five-stamp mill will soon be erected on the Cape Horn mine, near Copperopolis. The shaft on the Dora mine in Pine Log district is down 90 feet. The 10-stamp mill on the Rose Hill mine is kept going night and day. The contract for erecting a mill on the Fellowcraft mine has been awarded to M. Hertzig. The Schrack and Tada mine at Golden Gate is being worked by a double shift. Wise and Bunting have sold the Big Chief mine on Murray creek, above El Dorado. The new proprietors have let a contract for running a 200-foot tunnel. The Gwin mine shaft is down 1270 feet, and in a slate formation. The back wall for the mill has been built and grading for the site is now under way. Several loads of heavy mining machinery were hauled to the Fellowcraft mine this week, to be used in connection with the mill. The ten-stamp mill on the Leonard mine is to be torn down and taken over to the Fellowcraft where it will be put up. As soon as the mill is in running order crushing will commence. Drills will be worked in the mine and a dynamo erected. The shaft is to be sunk 700 feet.

Prince Poniatowski has been given a bond on a portion of the Gobbi ranch, two miles west of San Andreas, for two years for $24,000. One-half is to be paid in a year, one-half at the end of two years. The first installment of $1,000 was paid upon the signing of the bond.

El Dorado.

(Special Correspondence). — From Placerville to Grizzly Flat, twenty-six miles to the east, and from the same place through Kelsey for sixteen miles across the Georgetown Divide, a great deal of prospecting is in progress with a view to extensive development work. To the south and west of town considerable capital is at work in systematic delving for depth on the mother lode, and satisfactory results are becoming manifest.

The tunnel on the Vulture mine, owned by Dench & Craddock, one mile north of town, has reached 150 feet. It is on a 3-foot porphyry quartz ledge and a very good grade of ore.

The Gentle Annie mine is shipping 400 tons of sulphurets to the Selby smelting works.

C. E. Hayes and a party of San Francisco people bought a claim within half a mile of Greenwood. They have run 160 feet of tunnel and expect within another 100 feet to strike the lead.

The old Cedarburg mine, three miles northeast of Greenwood, which is said to have produced over $500,000 some twenty years ago, is being reopened. The old shaft has been cleaned and timbered to a depth of 318 feet. The bonders are preparing to place a steam engine and hoist.

There are about 200 stamps dropping steadily in this county and about 180 projected on new properties, to be erected this season.

Placerville, Cal., June 29, 1896.

Inyo.

At Mammoth Palmer & Judd have a 10-stamp mill running on ore from the old Mammoth tunnel. Wm Couch is superintendent.

Kern.

The following is from a private letter written by a mining engineer whose experience and reputation justify attention. Speaking of Randsburg, which he has just visited, he says: "The camp has the finest showing on the surface that I have seen in many a day, and if the ledges hold out in depth it is certain to become a very important mining district. It is free gold of high grade, running from $25 to $150 per ton. The deepest mine I saw was down 69 feet and still sinking; the incline does not show any footwall and the width of the ledge is undetermined. There are about fifteen or twenty very promising locations that are being developed. There is no wood or water at the mines. The water has to be hauled about twelve miles from Cow Wells and sells at $2 per barrel. If the district developes as well as it now promises to, they will probably secure power to pump water up from the valley and to drive the mills by electrically transmitting energy from Kern river, about fifty miles distant. I think the district is located on Section 35, T. 30 S., R. 40 E., and is about twelve or fifteen miles from Goler and Red Rock, where the placer mines are."

O. B. Stanton has bonded the Blue Chief mine on Greenhorn mountain, forty-five miles northeast of Bakersfield. It has a ledge five feet wide, assaying in gold and silver.

Advices from Randsburg report another strike in the Yucca mine, a mile and a half south of the Olympia group. The ore is said to run $400 per ton.

The owners of the Olympus mine at Randsburg will erect a 20-stamp mill thereon.

Mariposa.

(Special Correspondence).—As the Merced Gold Mining Company's call for $2 per share, or $200,000, can only be used for development work, it is to be presumed that the directors have made up their minds to carry out the original plan of putting up 100 head of stamps and bringing in electrical power from the waters of the Tuolumne river.

The bond on the Virginia mine now owned by Professor Clarence King and Paul Blackmar expires on the 14th of July. These gentlemen have done work on the property to the tune of about $8,000 without getting into the end of the old workings, and have suspended operations. It is stated on the best of authority that Messrs. King and Blackmar will pay what is necessary on the bond on or before the 14th prox., and that thereafter they will take their own time about further development.

The Coward shaft at the American mine is to be sunk several hundred feet, and a drift will be run in to meet it. The shaft is now down about 50 feet on a 4-foot ledge that shows free gold and prospects well. It is just below the water level and the character of the ore seems to be changing from loose sugary quartz to very heavily sulphureted rock. New pumps and hoisting plant have just been put in position.

The Tyro mine keeps its 10 head of stamps going night and day.

At the Louisiana, under A. C. Cable, superintendent, development work is going on steadily.

There is nothing positive to report about the Mariposa Grant. From information received on the ground it appears that John D. Ludwig is on his way back from the East. It is stated that the Messrs. Jones (Sam and Senator John P.), have made an arrangement with the other parties interested to look after the affairs of the grant for some time to come, and that Mr. Ludwig returns fully empowered on their behalf to set matters going.

At Red Banks, eight miles southeast on the Merced, the owners are watching the river. When it gets to fall level a dam will be put in and work started on a big scale. At least 100 men will be employed. The air in the tunnels is now so bad that work is next to impossible.

Coulterville, July 1st, '96.

Nevada.

Five stamps are to be added to the number in operation at the Brunswick mill.

At the Red Hill mine Superintendent Treadwell tells the *Union* the first cleanup amounted to more than he expected. He has cabled to the company in London that they may expect a handsome dividend from the start.

Placer.

The Morning Star mine of Iowa Hill has declared dividend No. 67 of $7 per share.

Plumas.

At Gibsonville Judge and Clough have let a contract for 100 feet of tunnel in the Union mine to demonstrate peradventure the presence of the "back channel in the Gibsonville ridge.

San Diego.

At Hedges the mill of the Golden Cross Company in charge of Receiver Stewart, E. W. Mellarkey and G. W. Bothwell is running to its full capacity.

The Queen mine which was closed up on account of fire in the timbers is again furnishing ore. A new pump is unwatering the mine.

The incline shaft of the Cross mine is down to the 300-foot level from which ore is being taken out.

The Crown mine is turning out 100 cars daily of $6.50 to $7 ore. The mill is crushing 350 tons per day.

Yuma *Sentinel:* The Golden Dream group has been secured by New Jersey men, who will crosscut the two veins in two places on each and also sink a shaft 50 feet in depth on each, and crosscut the veins at the bottom, in order to test the ores in each vein. They will erect a mill on the bank of the river one-fourth of a mile distant from the mines early in the fall.

The cut and tunnel have been run across Alcyon vein 31 feet reaching a depth of 24 feet from the surface at the end of the tunnel, where a pay streak of very rich ore was found showing a large amount of free gold, visible to the naked eye. The white quartz underlying the rich pay streak on the foot wall is also rich in free gold. The vein 2000 feet south of the tunnel is not as wide but much richer in gold, while 3000 feet farther south the vein is wider, prospecting good $5 ore. Taken as a whole, in 415 tests made of the ore all but thirty showed well in free gold with an average of from $7 to $15 per ton in gold.

Out of 460 tests made for 1400 feet in length on the Oro Blanco mine, which joins the Alcyon, all but 20 made a good showing in free gold, averaging from $5 to $7 per ton. The vein is from 20 to 100 feet in width, all of which carries good paying free-milling ore. The vein is cut nearly its whole length by an arroyo from 20 to 100 feet in depth. Cross arroyos expose large bodies of $5 ore.

S. E. Shankland and his associates, Brown and Graham, are opening a large vein of free-milling ore near Gariso gulch, four miles from the Colorado river, that is 107 feet wide.

Shasta.

(Special Correspondence).—At the Mountain Mines Ltd. Co., Keswick, the rolling stock of the railway is of the English pattern and wholly unsuited to the traffic. The development work on the mine has been diligent. The tunnels now pierce the big copper ore body from all sides. This body is oval in shape. The workings show one million eight hundred thousand tons of copper ore blocked out and ready to mine, and over two million tons of iron ore high in gold and silver.

Free Press: On Monday thirty men were put to work at the switchback on the Iron Mountain Railway above Keswick. They are grading a site for a large roasting plant. The ore from the mines at Iron Mountain contains a great deal of sulphur, which in smelting forms into clinkers and seriously interferes with the operating of the smelter. It is now proposed to haul the ore by rail from the mines to the roasters, where it will be dumped by automatic dumping cars into bins, from whence it is carried by chutes to the roasters. The roasting process will eradicate the sulphur from the ore, which will then be run off in chutes to the cars on the lower switch and conveyed to the smelters.

Siskiyou.

Journal: At the Barkhouse mines of Billups, Quigley & Humphrey the ore is still crushed in their twin arrastra, and at every cleanup they bring in a good-sized brick.

The Gold Ball mines on Sawyer's Bar have been paying well this year.

The Seattle Placer Mining Co., on Thompson creek, has completed a new ditch six and one-half miles long.

The Distlehorst & Barton Klamath River Dredging Co. will commence hoisting about the 20th of July. The promoters of this enterprise are busy getting everything ready, and are satisfied the dredger will prove as successful in the Klamath as it has in other streams.

McCook, Raynes & Co, who have a claim on the extension of the Siskiyou quartz ledge at Humbug, tested two tons of the quartz at McCook's mill last Monday, which realized $40 to the ton free gold, with considerable more not saved on account of the quartz being full of sulphurets. They intend sending a sample below for assay, in order to ascertain the real value of the quartz. The quartz is very heavy and undoubtedly rich in gold, although not visible to the naked eye.

The American Bar mine at the mouth of Ash creek, Klamath river, is now being worked energetically with good success.

The Fraser mine, near Happy Camp, owned by the Siskiyou Mining Co., was attached this week by Deputy Sheriff Radford.

At the Bunker Hill mine, Klamath river, near Happy Camp, the ditch they have been building is completed.

Trinity.

Journal: Operations have begun on the Lappin mines in Deadwood, owned by Cochran, Brady & Tourtellotte.

McLean Bros. of Redding have a contract to complete the Rush Creek-Stuart's Fork tunnel. About 1100 feet of the tunnel is completed and they will finish the remaining 9000 feet. They expect to complete it early in 1897. The original survey showed that about three miles of flume could be constructed and used to advantage, but on account of the high price of iron it is now proposed to considerably increase the length of the flume, reducing the quantity of pipe required.

Tuolumne.

The *Independent* is informed that the Mustang mine near Confidence is now under bond to Hugh Callahan, who will put on more men and extend developments.

From south of Sonora, and toward Jamestown protests have been filed at the local Land Office against the State selections of lands, some of these selections are supposed to be agricultural lands. That region is considered mineral land, though in the years of surface mining Chinese worked over the ground, and it was turned into pasture for cattle and sheep. To obtain title to these lands applications were made to the State for selections as agricultural lands in lieu of the sixteenth and thirty-second sections for school lands. There are over twenty protests filed by those who claim that the land is still mineral, and who have filed mining claims on the same. The trials will be held this month and next.

The Mazeppa mine, adjacent to the Juniper, has been sold to New York men, who will sink a vertical shaft. The Juniper's new mill is about ready for use. The new chlorination works at the Rawhide are in process of construction. At the App connection has been made between the shaft from the surface and the upraise from the 800-foot level.

Yuba.

(Special Correspondence). — Camptonville mining district is situated fifty miles northeast of Marysville. The Honeycomb Mining Co.'s property is one mile northeast of Camptonville. W. B. Meek is superintendent. This mine is soon to be in operation. The ore body runs northeast and southwest, stands nearly vertical, pitching slightly to the east. The hanging wall is slate and the footwall granite, from 12 to 14 inches thick. A shaft has been sunk 90 feet, but the present development is being done through a tunnel, now in 245 feet, which will be, when completed, 305 feet long and will tap the ledge 150 feet below the croppings. At this point an upraise will be made; and if the ore body holds its own, as developed in their shaft, a mill will be erected this fall. Twenty mill tests from ore taken from the shaft while sinking, I am credibly informed, paid an average of $25 per ton, and they have about 100 tons of such ore now on their dump. The ore is free milling, with no sulphurets.

Brown's Valley, in and around which place is situated the Brown's Valley mining district, is twelve miles northeast of Marysville. It contains about 300 inhabitants, one-third of whom are living in tents. Two-thirds of the present population have been added within the past six months, owing to the impetus given to prospective mining. Three new companies have started up within the time mentioned. A town site has been laid out, surveyed and eight lots sold by a Marysville syndicate. Buildings are being contracted for, and several will be erected in the near future. The principal mines are the Webb Gold Mining Co., located within the town of Brown's Valley, consisting of three corporations—the Dannebrog, the Pennsylvania and Jefferson G. M. Co.—combined in one corporation under the above corporate title. J. C. Campbell is superintendent. This company owns the Pennsylvania and has the other two under bond. In addition, they own the following claims: The Hawkeye, Blowsnake, Northern Light and F. W. P. Their improvements consist of a 20 stamp mill (built for 40 stamps) nearing completion—in fact, it will be in operation by the time this appears in print. The Dannebrog and Pennsylvania properties are covered by U. S. patents. This company's plant and mines cover an area of 4900 feet in length by 1000 feet in width. The ore body runs north and south and pitches east on an angle of from 45° to 48°. The ledge runs from 12 inches to 8 feet thick between walls of porphyry and greenstone, the latter constituting the footwall. The principal development is at present confined to the Dannebrog, upon which an incline shaft is now down 550 feet, following the trend of the vein. They are running five power drills with their air compressor. Thirty-five men are employed, but in a few days, or as soon as the mill is set in motion, this number will be increased to forty-five. A shaft has previously been sunk on the Pennsylvania on the incline of the vein to a depth of 800 feet, and a similar shaft on the Jefferson to about the same depth. These shafts are full of water. It is the intention of this company to unwater and thoroughly prospect the lower levels of each. They are extracting about thirty tons of ore daily from the Dannebrog, which the superintendent informs me will mill $10 per ton. It carries about 2% high-grade sulphurets.

The Faust mine, formerly known as the Hibbert & Burris, adjoins the Dannebrog on the northwest. It has been bonded to a San Francisco syndicate for $15,000 by Hibbert & Burris. A. H. Walrath of Nevada City is the superintendent. Under his management the company is sinking a shaft, now down 200 feet. This mine is of the usual length, 1500 feet. It runs northwest and southeast and pitches northeast, with a ledge about two feet thick, confined between walls of porphyry and greenstone, similar to those of the Dannebrog. A drift has been run in from the 120 foot level 380 feet. Their improvements consist of a fine hoist and a 5-stamp prospecting mill, run by steam power. They are mining and milling about ten tons of ore per day that I am informed pays them about $20 per ton. A mill test of 100 tons did pay $20 per ton. They are at present working twelve men.

The Old Flag mine, located half a mile north of Brown's Valley, is a corporation, of which S. Blight is superintendent. The ore body of this mine runs north and south and pitches west at an angle of about 45° and runs from three inches to three feet in width, between a hanging wall of slate-mixed porphyry and a footwall of greenstone. Their improvements consist of a hoist and pumping plant run by steam. This mine is being developed through a shaft now down 300 feet. Several drifts have been run at the 100, 200 and 300 foot levels aggregating 200 feet in length. The ore is free milling, and from a mill test of 400 tons of rock from this mine it paid about $16 per ton. The superintendent informs me that a mill will shortly be erected upon this property.

Smartsville, eighteen miles east of Marysville, contains about 400 inhabitants. At one time in the early days of hydraulic mining it supported a population of over 2000 people. Its great banks of still untouched pay gravel, the perfect condition of its great water canal and the staying qualities and patience of its people indicate that some time the mines in and around Smartsville will again be productive.

The Excelsior Water and Mining Company is a corporation, the principal office of which is located at Smartsville. W. G. Halstead is president and treasurer and Joseph Dunfee is secretary. The principal properties of this company are located on the south side of the Yuba river. They are varied in character, and consist mainly of placer mines, a water system, ranches and orchards. Of mines and mining ground this corporation owns about two and one-half miles in length of the Pliocene Yuba channel, a gravel deposit varying from 200 to 700 yards in width and about 400 feet in length. About one and one-half miles of this company's possessions have been worked out, which yielded some $12,000,000. One portion of this deposit embracing only 800 feet of the channel yielded over $1,000,000 in net profits. Their minimum supply of water will aggregate 3000 miners' inches through the driest season, which is supposed to be an abundance for irrigating 15,000 acres of land. This company have also under their control reservoir sites that will nearly double their capacity when brought into requisition.

Timbuctoo, now nearly depopulated, is one mile west of Smartsville. It is now a part of the Smartsville or Empire mining district.

The Mark Antony quartz mine (a corpora-

tion), located three-fourths of a mile nearly south of Timbuctoo, which has been idle for over fifteen years, is again about to spring into activity. This company's claim consists of 5000 feet of a lode or ore body, with 300 feet on each side, located previous to 1872. It runs 20° west of due north and 20° east of due south and dips to the west on an angle of 12° between walls of hard slate. Their improvements consist of a 10-stamp mill, nearly complete in all particulars, but only primitive hoisting machinery. The developments consist of an incline shaft sunk near the center of the claim on the trend of the vein to a depth of 175 feet, exposing an ore body 5½ feet thick. At a depth of 100 feet a tunnel has been run in on the vein to drain the shaft. A new shaft is being sunk on the ledge about forty feet southeast of the mill, which is located at the mouth of the tunnel, now down about 60 feet.

The Beehive mine, four miles northeast of Forbestown, but in Yuba county, has just been taken hold of by a Chicago syndicate, under the superintendency of Oliver Roberts, formerly of the Pine Nut district, Nevada. They have a shaft down 170 feet, exposing an ore body three feet thick, a tunnel in 200 feet and an 8-stamp mill, all of which are undergoing repairs.

The Steele gravel mine, located in Yuba county, one and one-half miles south of Forbestown, in Butte county, is owned and managed by T. H. Steele. This property consists of 320 acres of an ancient river bed located on the north bank of New York Flat creek. It is worked by the elevator hydraulic process. Twelve men are employed running two giants night and day. Restraining dams hold the debris in conformance with the Caminetti act. This mine cleans up but once a year. It is reported that last year's cleanup aggregated some $42,000. My next letters will follow from Butte and Plumas counties.

L. P. Mc.

NEVADA.

ESMERALDA COUNTY.

The Pamlico Mining Company, near Hawthorne, have milled 6300 pounds of ore. Mint returns show a value of $435 50 per ton and the gold value of the bullion $17.42 per ounce.

HUMBOLDT COUNTY.

Deegan and Denio in Pueblo district, a month ago started up a 1-stamp mill, with a capacity of about one ton a day. In that time it has produced gold bullion valued $1850, from twenty-three tons of ore.

OREGON.

JOSEPHINE COUNTY.

A mill test of twenty tons of ore from the Clint & Jones mine, in Mt. Reuben district, yielded an average of $48 to the ton.

Schieffelin & Co.'s mill at Bunkum, in Foot's creek district, is doing considerable custom work.

Miller & Davidson of Missouri Flat brought $800 worth of gold dust to Grant's Pass last week.

Geo. B. Dornin is operating the Jewett mill and mine, near Grant's Pass.

The Panther Creek Mining Co., operating on Oak Flat, in lower Illinois river district, have placed an additional giant in position.

The annual cleanup at the Hampton mine, Grave creek, shows nearly $100,000 gold from 3 of the 100 acres of ground owned by the company. Last year a $50,000 ditch was built, and the year previous another costing a large sum, and for two of the claims $40,000 was paid. On the average, sixteen men are employed, night and day shifts, who are paid $2 per day without board.

LANE COUNTY.

At the Bohemia mine there are 150 men on the payroll.

UNION COUNTY.

The 20-stamp mill of the Union and Companion mine, Cornucopia district, has started up.

WASHINGTON.

The Leavenworth *Times* reports the sale of the North Pole group of mines, on Nigger creek, to Seattle men for $50,000, $3000 down and $5000 August 12th.

BRITISH COLUMBIA.

Talking of Trail creek to a Seattle reporter C. C. Woodhouse says the geological formation of Rossland is hornblendic diorite; the veins cut through it easterly and westerly, with positive strength. The ore is prehotite and chalcopyrite, iron mono-sulphide and copper desulphide in a quartzose matryx, with a mixture now and then of calcite. In just what chemical condition the gold exists is a question among chemists. It is invisible before roasting, and visible after roasting and panning the prepared ore. Being a non-desulphide, the ore is easily desuphurized by washing preparatory to smelting. Much of the ore contains a large excess of iron, making it a very desirable ore for smelting.

The deepest shaft in Rossland is 500 feet. The veins are so strong and continuous along the surface that mining engineers are willing to make preparations at once to work the mines on a systematic plan, by putting down double-compartment working shafts, with hoisting machinery, even before prospect work has been done. There are several such plants now being installed. There is also much preparation being made for diamond core drilling on the veins.

The Columbia & Western railway has lately been constructed from the Heinze smelter at Trail, on the Columbia river, to Rossland, westerly seven miles. D. C. Corbin's Red Mountain railway from Northport, on the Nelson & Fort Shepherd railway to Rossland, a distance of sixteen miles, is under construction.

The Canadian Pacific has surveyed a line from Robson on the Columbia river, south thirty miles to Trail, and the Columbia & Western will build from Trail to Sayward, on the Nelson & Fort Shepherd, with three rails, a distance of six miles, which will connect the Canadian Pacific system with the American system of railways.

The ore generally is too low grade to admit of long transportation, and should be locally treated.

J. C. Ryan, manager Antoine and Eureka mines, furnishes the Kalso *Kootonian* the following figures, showing the net earnings of sixteen Slocan mines during the first six months of 1896. The gross earnings are placed at $1,500,000. The net earnings he places at $515,500 as follows: Slocan Star, $100,000; Ruth, $25,000; Reco, $30,000; Goodenough, $20,000; Whitewater, $40,000; Wellington, $40,000; Last Chance, $25,000; Monitor, $20,000; Idaho Group, $125,000; Northern Belle, $20,000; Payne Group, $20,000; Slocan Boy, $4,000; R. E. Lee, $10,000; American Boy, $4,500; Antoine, $12,000; Deadman, $20,000. Total, $515,500.

ALASKA.

William Hutchinson, from Cook's Inlet, Alaska, where he spent two months, says there are 1750 people on Six-Mile creek and about as many on Resurrection creek. About 750 of them are making from $2 to $15 per day at placer mining, but the balance, he says, are absolutely helpless and unable to find enough to keep them alive. Some of the prospectors, many of them old miners, would like to go to the Yukon country. That, however, is 200 miles away and it is currently reported that the Copper river Indians, who live between, are on the warpath.

IDAHO.

The Idaho *World* asserts that the aggregate gold output of the placer mines of Boise county is $300,000,000.

At Juliaetta it is believed that the high-water mark in the Clearwater has been reached for this season, as the water has been receding. This proves that the heavy fall of snow in the Bitter Root mountains has been nearly all exhausted.

A stream of miners and prospectors is making its way into the mountains, especially to the old camp of Florence, as several strikes have been made, while other and more developed claims have been sold.

Four quartz mills have been erected this summer. The largest one, of 150 tons, will be erected on the Ozark, two miles from Florence.

At Burke the water is pumped out of the old workings of the Hecla and sinking begun.

At Gem the Gem mill and mine employs sixty men. The work is largely development.

The Frisco is running with a full force, crushing 500 tons a day.

At Florence a company has been formed with a capital of $250,000 to build a first-class custom stamp mill.

MONTANA.

The Colorado Smelting and Mining Company brought suit last week against the Original Butte Mining Company for $95,748 84; levy was made on defendant's mines, west of Gagnon, near Butte.

The annual report of the Iron Mountain Mining Co. of Missoula shows the mine and mill paid in dividends $85,000. There were mined during the year 66,856 tons of crude ore, which produced 5767 tons of concentrates. These concentrates were loaded into 265 cars for shipment and produced net returns of $326,378.43, or an average of $1231.62 per car. From these shipments there were 497,889 ounces silver, value $333,586 23; 4,466,103 pounds lead, value $138,332.44—a total of $472,-008.67. The freight and treatment cost $145,630.24; net returns, $326,378.43. The current expenses for the year were $203,318.57, leaving a profit of $123,059.86.

The largest blocks of copper ever shipped from the Rocky mountain region are now being cast by the Anaconda Company for shipment to St. Petersburg, Russia, says the *Recorder*. They average in weight 3600 pounds and measure 6 3-16 inches thick by 42 inches square. The company has an order for 200 long tons to be used for armor plate in lining battleships of the Russian navy. After it arrives in Russia it will be rolled out into sheets.

WYOMING.

At Green River the owners of the soda well are pumping the product into evaporating vats. The capacity is 2500 pounds of soda every ten hours, the commercial value being $50. It is estimated that, with sufficient vat capacity, the plant will pay a profit of $75 a day.

COLORADO.

W. F. Kendrick says: "When I commenced mining here in 1874 I went to the mines in a stage coach or in my own conveyance; smelting and freight rates were high and nothing but the mines with rich ore could be worked, as illustration: In the Alma, Leadville, Gunnison and San Juan districts it did not pay to ship out ore carrying less than $100 per ton; at Alma the freight charges to the smelting works were $20: smelting charges, $30 to $35; discount for loss, 20 per cent, or $20 on $100 ore; sampling charges, $5; so that $100 ore sold at $25; at the present time $100 ore at the same place is paid for as follows: Freight charges, $5; smelting charges, $7; discount for loss, 5 per cent, or $5; no sampling charges: making in all $17; so that $100 ore is worth today $83, as compared with $25 twenty-two years ago. Now the freight is regulated according to value. On ore carrying $12 per ton the freight to Denver is $1 per ton; on $20 ore, $2; on $35 ore, $3, and above that $5 per ton, and the smelting charges are regulated, according to character, from $1 to $10 per ton; as illustration: a pile of low-grade material, carrying $7.45 per ton, was thrown away at Alma as worthless two years ago; this was shipped to Denver recently and sold at a profit as follows: freight charges, $1; smelting charges, $3; discount, 5 per cent, or 35 cents, making $4.35, and leaving $3.10 per ton net on the $7.45 ore."

Silverton is enjoying an advantage in the facilities of treating ores, as well as in freight rates. There is a shortage of ores below the capacity of the Durango and local smelters, and this is giving as low as a $5 charge for smelting. The Silverton matte smelter is kept running on the sulphide ores of the Genessee Vanderbilt, Guston, National Belle and Hudson at Red mountain and treating the dry ores of Maggie gulch. It handles 140 tons a day and is short on the particular class of ores it demands. Nearly all the ores of the district carry more lead than the miners can afford to lose on this process. The lead concentrates from the mills of the district are shipped to Denver, Durango and Pueblo smelters, the freight rate to Durango being $2 a ton, against a $7 charge to the other points. The Crooke mill extracts the values by a modified chlorination process, but handles a class of custom ores that is not produced in any considerable quantity in the district, though it is kept running on less desirable ores from the North Star or Solomon, owned by the proprietor of the mill. This situation, while not expected to continue throughout the season, makes a particularly advantageous market for the miner.

At Durango, on the 25th ult., while blowing out furnaces of the Standard smelter, previous to closing it down for a while, a matte fell in a well, causing it to explode on one of the furnaces. The building caught fire and was destroyed. Loss $20,000, partially insured.

The State Land Board and the State Engineer have prepared the following rules which will govern the subdivision of State lands into mineral lots:

The engineer shall first make an accurate survey of the boundary of the section to be lotted, taking vernier angles and measuring with a steel tape each side, to locate all the section and quarter section corners.

In case any of the Government section or quarter section corners are missing, the proper survey shall be made to re-establish them according to law, and the rules of the United States general land office.

A corner so re-established shall be marked by a large stone firmly set and properly marked with a chisel.

All the lot lines shall run parallel with the south and east boundary lines of the section, whether it makes the lots perfectly square or not, and whether said boundary lines are straight from one section corner to another, or describe an angle at the quarter section corner.

Wooden monuments at least five inches square and three and one-half feet long, well set two feet into the ground, with a nail in the top to mark the exact corner, are to be placed at all the lot corners, except at the section corners.

The monuments to set diagonally, with the corners on the line of the lots, and on each side is to be inscribed the lot number towards which it faces, in figures at least two and one-half inches long, which are to be painted with a durable black mineral paint.

In case the lot corners occur on an inaccessible point, where it is impossible to set a monument, a witness corner is to be set on the lot line, as near the true corner as possible, and properly marked to denote its position relative to the true corner.

At least four of the lot corners on each line across the section shall be witnessed by trees or other natural objects, properly marked, and the field notes shall show their position in relation to the lot corner.

In case a portion of the section is not owned by the State, or it is not considered desirable to lay it out into lots, the necessary corners to establish the boundary between the lotted and the reserved portions shall be set, and the division of the State land shall proceed in the same manner as when the entire section is to be lotted, by starting at the southeast corner of the section and measuring the full lot distances both west and north.

The lots bordering the reserved portions to be fractional the same as on the west and north sides of the section.

The map shall be platted on tracing vellum, 16x20 inches, at a scale of 400 feet to one inch, showing accurately, both as to angles and measurements, the section boundaries, and all the lot lines with the acreage of each lot.

The field notes shall be made on sheets the same size as the map, and bound to it, and shall show in detail the full notes taken on the survey, including the surveys to establish the missing corners (both section corners and quarter-section corners), the survey of the boundary of the section, and the latitude and departure notes to check the same, the order in which the lot lines were run, and all the other notes taken, followed by a certificate of the engineer making the survey as to its accuracy.

NEW MEXICO.

At Pinos Altos the Mammoth mine and 10-stamp mill are running steadily, shipping a gold brick every week from eight to thirteen pounds in weight. The concentrates saved produce about 50 per cent of the value of the gold saved on the plates.

ARIZONA.

W. D. Luce is erecting a cyanide plant at El Rio, near Yuma.

The *Republican* reports that the Silver King mine is again being worked and has a larger ore body than ever in sight.

The Commercial Mining Company's smelter at Big Bug is reported to be making one of the most successful runs in its history and has already turned out 60,000 pounds of matte.

The Pima Mining and Smelting Company of Arizona says it has 10,000 tons of copper ore in sight averaging 12 per cent in copper, with traces of gold and silver.

Kingman *Miner:* Mr. Pope, of San Bernardino, has just finished a survey of a line for eighteen miles of pipe. It is proposed to carry the water of Iron Springs by gravity to Gold Basin, where it will be used for milling purposes. The water of Grass Springs has also been secured, and if necessary will be piped to the mines. A 60-stamp mill will be put up on the mines and two hundred tons of ore per day will be milled.

AUSTRALASIA.

WEST AUSTRALIA.

(Special Correspondence.) After a long and tiresome journey, I have arrived here at last. I have been here two weeks, but have not got settled down to much of anything yet. First and foremost, I can assure you that this country is not by far what it is represented to be. I have no doubt but what there are a few good mines on the field, but most of the so-called rich mines exist in the imagination of a lot of mining speculators. The way some of those people boom the country is a shame. They not only ruin the field, but are the direct cause of misery and hardship. They will start a sensational report about some rich discoveries about a hundred miles or so in the interior of the country, when there will be a rush of hundreds of people for the place, and neither food nor water can be had at any price.

I have traveled nearly 500 miles in stages since I arrived at Coolgardie and have seen several graves on the road, where some poor unfortunate is taking his last sleep.

Typhoid fever is prevalent here to an alarming degree. At present all hospitals on the field are full of fever patients; but the cold weather will soon set in, when it will be somewhat better for a few months.

This country is the most trying on a man that I have ever been in. Nothing in the way of fresh provision; everything is canned goods. All water must first be condensed before it can be used for any purpose. The price of water varies from 10 cents to 25 cents per gallon, according to localities.

Board and room in this place is £3 3s, or about $15.75 per week, and poor board at that. So you can see how essential it is for a man to receive a good salary.

Freight from the end of the railroad to this place is £40, or about $200, per ton; distance, 140 miles. A 2-pound can of California fruit is from 80 to 90 cents; flour, £65 to £75 per ton, or about $350; horse feed, from 16 to 20 cents per pound; a quart bottle of beer is 4s, or $1, and everything else sells at outrageous prices.

Miners' wages are out of all proportion to the prices of living in and around Coolgardie. Miners get £3 10s per week and drinking water; at this place. £3 15s, and £4 per week and water, or about $20 in American money at the most. The majority of the miners are boarding themselves the best way they can, so as to save enough money to take them out of the country again.

Thousands of men are coming into this colony every month, and no work for a large per cent of them, as the mining companies can not get supplies or machinery on to the field. When I left Freemantle three weeks ago there were then 30,000 tons of freight lying scattered around for transportation to the mines, and thousands of tons have arrived there since then, with no immediate prospect of even a slight chance for months to come to raise the blockade.

The West Australian Government has got everything in the country in a fearful muddle, as nearly every branch of industry is under Government control. To even begin to describe the state the country is in, or will be, is almost impossible. The company that employs me has mines, or rather holes in the ground, in different districts. I have visited several of them since I came here, and I can truthfully say I have not seen a single good one in the lot.

I have just got back here from a trip to one of the company's claims, where the general manager sent me to report upon. I have sampled the ore thoroughly all over the mine and on the surface. The best assay was 10s per ton, at a depth of 90 feet—the bottom of shaft. The assay in one place was 15 grains and in the other a trace of gold. You can judge what sort of property that is to erect a mill upon, and that particular claim is one of the gilt-edged ones of my company.

The mine I was sent out here to manage was abandoned twice by the original owners before it was floated on the London market. I have been informed that £1,500 was paid for it to the last owners, and along with a few other prospects it was floated on the London market for £250,000, or $1,250,000, with £70,000 working capital. The men who floated the mine still retain the largest portion; but, from all appearances, they are trying to get rid of their holdings before any milling is done.

The general sentiment and feeling of the people is that the only salvation for this overrated field is to keep mills away from here as long as possible. Once the mills are erected and running for a month or so, you will surely hear of the most gigantic mining swindle ever perpetrated upon a confiding public.

Do not pay any attention to any newspaper talk or so-called mining experts' reports, as they are in most every instance made for the purpose of booming the stock market in London.

It is very amusing to read some of the reports of these mines made by so-called experts, when in fact lots of them have never done a single day's work either in a mine or a mill and could not tell a piece of gold-bearing quartz from a piece of country rock.

I do not think there is a single mine now in operation in West Australia that will pay the investors 1 per cent on their money. The principal trouble is that the mines are over-capitalized. Among others, I know of one claim which was floated on the London market a few months ago for £250,000, or about $1,250,-000. At the time it was foisted on the confiding public, I am informed, there was scarcely enough work done upon it to hold the ground according to law.

To give you an idea how this great mining swindle is accomplished: There is a mine, called the Great Boulder, four miles from Kalgoobi. Parties will locate a claim some-

where within five or six miles of said mine, not even on the same ledge, and call it Boulder Extended, or Boulder something else. As long as they can get the name of Boulder in some way or other it will fool the English people, or, as they call the English investors here, "muggs."

If you ask a man who is well acquainted with the country whether he thinks the mines are or will come anywhere up to expectations, he will invariably say: "Make what you can while the boom is on. As long as we can keep mills out of the country we are all right." I must say that our manager is doing the best he can to keep things going on a slow basis. There are no mills crushing ore yet in this camp. I understand, though, that one company is going to make a trial of their mill within a week or two. Said property is considered one of the best in the district, if not the best. So everybody is anxiously waiting to know the results.

I expect to see some glowing reports upon it. It matters little whether they are true or not. My advice is for Americans to stay at home by all means.

* * * * * * *

West Menzies, Australia, March 14, '96.

Personal.

G. McM. Ross has returned from Arizona.

Col. Geo. Stone has returned from Cripple Creek.

Jas. H. Tibbitts, of Amador, has decided to remain in Johannesburg.

Supt. Root of 9 Fremont street, is back from a business trip to Los Angeles.

Walter McDermott succeeds Mr. Seymour as chief engineer of Fraser & Chalmers, Ltd.

Frank Davis, of the Ybarra G. M. Co., has returned from Lower Cal., and is in Alameda.

T. B. Dillon has resigned the superintendency of the French Creek mines, Siskiyou Co.

T. A. Rickard, Colorado's State Geologist, is examining some mines at Neihart, Montana.

Gen. Duffield, superintendent of the Coast Geodetic Survey, is expected in this city about the 1st prox.

The resignation of Cecil Rhodes as director of the British South Africa Company has finally been accepted.

A. M. Keller, formerly of the Parrott, Montana, smelting works, is now in charge of operations at the works of the Mountain Mines Co., Keswick, Shasta Co., Cal.

At the commencement exercises of the graduating class of '96 from the Stevens Institute of Technology, Hoboken, N. J., held June 19, 1896, the degree of Doctor of Engineering was conferred by the faculty and trustees of Stevens Institute upon Commodore George W. Melville, Engineer-in-Chief of the United States Navy, in appreciation of the excellent engineering work performed by Commodore Melville for his country and the advancement of the science of steam engineering, well illustrated in the world-wide famed "White Squadron." Only once before in the twenty-five years' history of the Stevens Institute has the degree of Doctor of Engineering been conferred, and then upon Professor R. H. Thurston of Rhode Island, who formerly occupied the Chair of Mechanical Engineering in Stevens Institute, and is now Director of Sibley College, Cornell University.

Commercial Paragraphs.

I. S. Van Winkle & Co. shipped two Kinkead quartz mills to the Dexter Gold Mining Company, Tuscorora, Nevada, this week, together with their Daniel Best crude-oil engine as the motive power.

The Consolidated Kansas City Smelting and Refining Company has contracted with the Bunker Hill and Sullivan Mining Company, Cœur d'Alenes, Idaho, for a portion of their product of concentrates.

Messrs. Faneuf & Moffitt, successors to the Perkins Pump and Engine Co., at 117 Main street, this city, are prepared to build pumps and engines on short notice, or do general repairing. They are experienced engineers and machinists.

Frazer & Chalmers recently constructed a 20-stamp mill in the mining district of North Carolina. This is an event of more than usual importance, as showing that even in that direction and in the mountains of Georgia, where primitive methods have been the rule for many years, the march of improvement in mining is making itself felt. The mines in the South were worked in a desultory fashion for nearly a century. The methods used in extracting the ore were, prior to the war, similar to those now in use in many parts of Mexico. The anastra was in general use and in many cases negroes were employed to pound up the quartz in mortars for the amalgamation. There were no mills, no pans and an amalgamation plant was never heard of. The dirt was put in sluice boxes and was taken up by the quicksilver in the riffles. All the work was done by hand. The ore was put in small sacks, which were carried to the surface by the laborers and dumped in a convenient place for the crushers. A good hand could crush about 500 pounds in a day, and even with the small cost of labor ore carrying less than $20 per ton could not be worked.

Recent California Mining Incorporations.

La Suerte Gold Mining Co., San Francisco: M. A. de Laveaga, R. Herold Jr., F. Hess, L. S. Rose, A. T. Vogelsang; capital stock $10,000,000, $5000 subscribed.

Mount Diablo Gold Mining Co, San Francisco; P. Deidesheimer, W. J. Sutherland, P. A. Finnegan, J. P. O'Brien, H. Zadig; capital stock $1,000,000, all of which has been subscribed by the above.

Coast Industrial Notes.

—San Diego city has decided to issue $1,500,000 bonds and own its own water works.

—The new cannery at Fresno is offering $12 per ton for apricots; the growers ask $18.

The McCloud River & Siskiyou Lumber and Railroad Co. have men at work grading.

—The *Daily Commercial News* celebrates its 21st birthday by a superbly illustrated annual review.

—The Southern Pacific Co. has cut freights to and from all points reached by the S. F. & S. J. V. Railway.

—It is confidently expected that one of the big battleships, for which bids are now asked, will be built on this coast.

—The Southern Pacific has made a rate of $15 per ton on ore from the White Cloud district, White Pine county, Nev., to Salt Lake.

—About $300,000 is now available for Government work at the Mare Island Navy Yard, and a large additional number of men will be employed.

—The first 150 tons of rock from the State crusher at Folsom, for macadamizing streets, was used in Stockton, where the rock is delivered at 45 cents per ton.

—A treasury warrant for $578,000 was drawn by the Government last Saturday in favor of the Union Iron Works of this city, the final payment on the battleship Oregon.

—D. M. Murphy of San Jose has acquired title to a vast tract of country at Durango, Mexico, and has a contract to deliver 200,000 railroad ties yearly at the city of Durango at 70 cents apiece.

—Last Tuesday in this city the Circuit Court of Appeals defined the boundaries of Bering sea, and decided that any vessel could hunt seals in Alaskan waters outside of the three-mile limit.

—The rapid increase in the amount of flour exported from Oregon and Washington has an important bearing upon the development of the dairy industry, from the fact that it largely increases the supply of bran and shorts.

—Cattle are reported dying of starvation on the ranges of Arizona. The greatest loss is in Verde county, eastward from Flagstaff, and in the Skull Valley ranges, where the animals are perishing by thousands, the mesa being entirely bare.

—The San Diego & Yuma Railroad Co. has incorporated at San Diego, Cal.; capital stock $4,000,000. The company will ask the citizens to subscribe to a guarantee fund of $480,000 to secure 4 per cent interest on $4,000,000, the estimated cost of the road from there to Yuma.

—The Marysville and Nevada Power and Water Company has incorporated in Yuba Co.; capital stock $2,000,000; subscribed $1,040,000; directors, J. Spaulding, Auburn; J. O'Brien, L. Conrath, Smartsville; D. P. Donohoe, Marysville; R. C. Walrath, W. E. Englebright, Geo. L. Hughes, Nevada City; furnish electricity for power and light.

—The recently appointed forestry commission will soon begin its work of investigating forestry problems and outlining an administrative policy on the subject. The investigation will begin in Montana and extend into Idaho, Oregon, Washington, California, Colorado, Arizona and New Mexico. The work is expected to take up the time of the commission during the summer and autumn, at the end of which latter season the work of preparing a report for submission will be undertaken by the commission. There will be a preliminary meeting at Chicago next week.

—The possibilities of the fishing banks of the Pacific ocean are shown in the catch of the fishing schooner Annie, says the *Astorian*, which arrived on the sound lately with 18,000 pounds of fresh halibut, captured in a twelve days' cruise off the Cape Flattery banks. In that section the fish are sold at 2 cents a pound for home consumption and shipment in small lots. Halibut banks are found all along the coast, one ground being off Point St. George, in this county, where any quantity of these fine food fish can be caught, besides many other kinds of fish which command a good price in the markets. Other grounds in the near vicinity are those off Chetco, to the north, and off Trinidad, to the south.

Recently Declared Mining Dividends.

On the 1st inst. the Morning Star mine, Iowa Hill, Placer Co. declared a $7 dividend—its 63rd.

The Mammoth mines, Tintic district, Utah, paid a dividend of $20,000 on the 1st inst. This is the first dividend since 1891.

Calumet and Hecla Copper Company, Michigan, $5 per share, payable July 13, aggregating $500,000, making $45,850,000 in cash dividends to stockholders.

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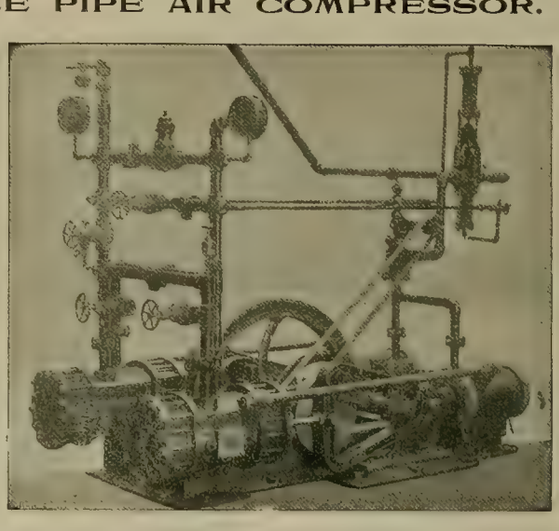

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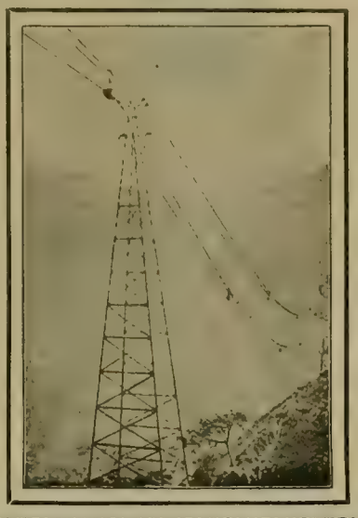

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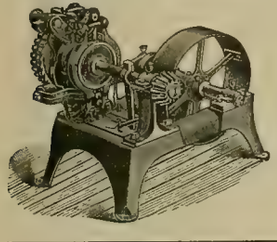

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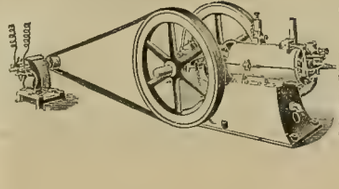

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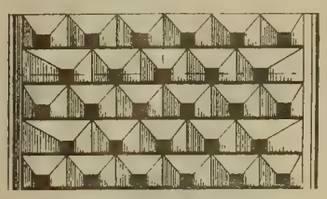

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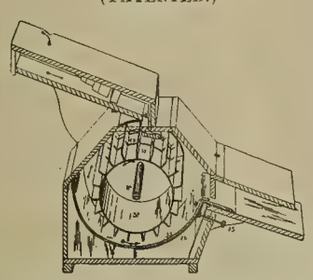

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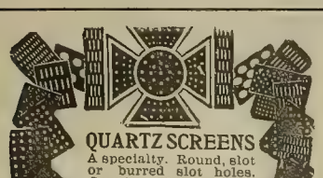

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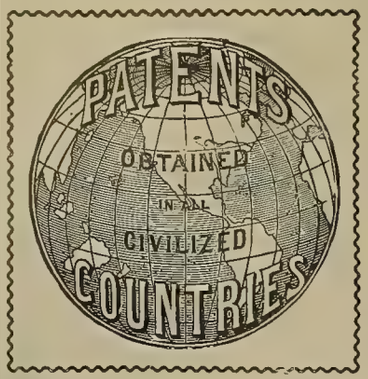

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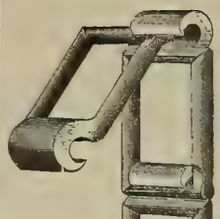

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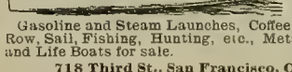

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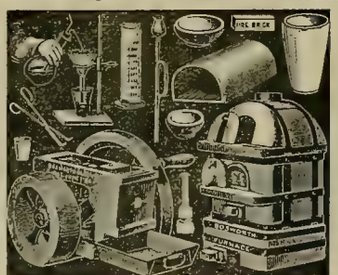

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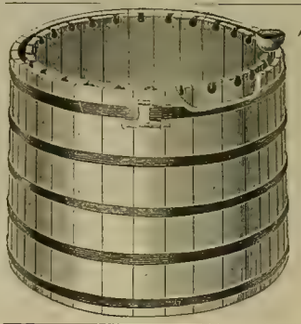

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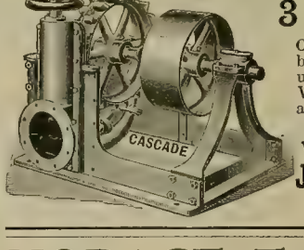

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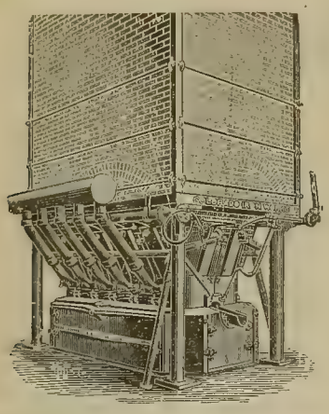

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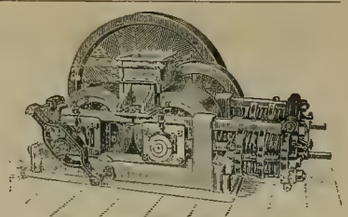

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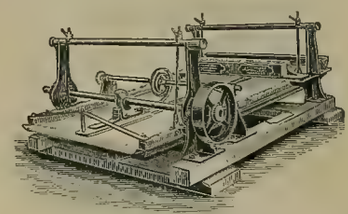

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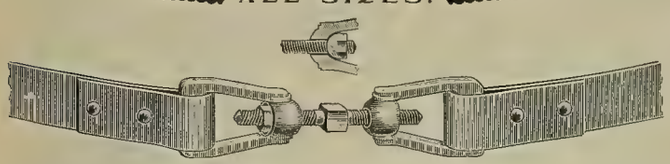
ALL SIZES.



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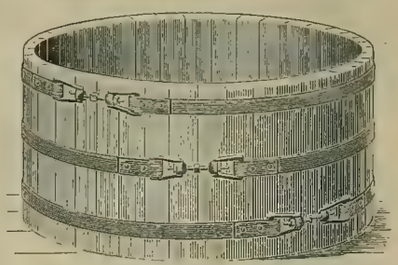

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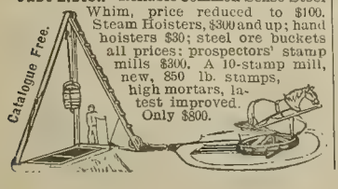

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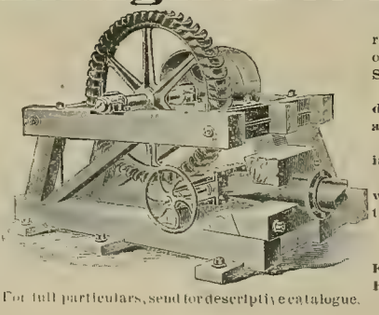
Knight's Water Wheel.



For full particulars, send for descriptive catalogue.

The accompanying cut shows the general arrangement of **Knight's Standard Water Wheel**, of which there are **hundreds in use** in different States of the Union.

These Wheels are made from **2 feet to 6 feet in diameter, from 10 to 1000-horse power, and adapted to all heads and purposes.**

Wheels inclosed in iron cases, from 6 to 24 inches.

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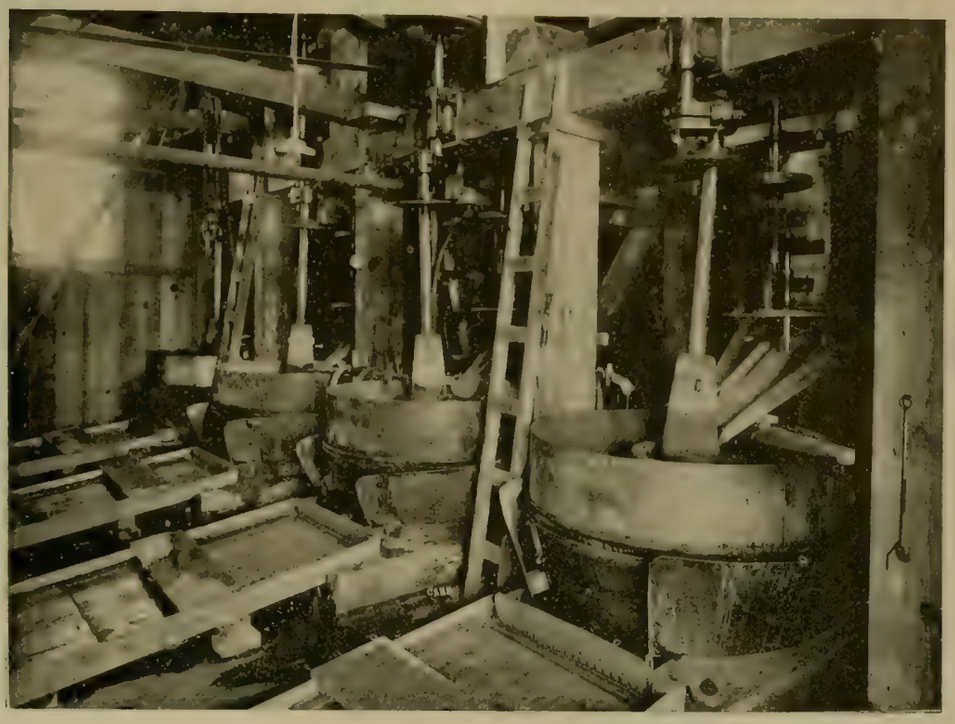

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The Kinkead Quartz Mill will do the work of five stamps with less than half the power, and can be built and put into operation for less than half the cost of stamps. The only wear is the shoe and die, which is less than that of one stamp. The cheapness in first cost and operation of this mill makes it possible to work with profit ores so low in value that they have heretofore been treated as waste. Each mill will crush 10 tons in 24 hours through a 40-mesh screen.

It requires only a 2-horse power Daniel Best Crude Oil Engine, to operate this Mill and one concentrator. Engine and Mill can be set up and running in 48 hours.

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Work the Best! Prices the Lowest!

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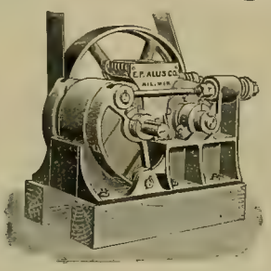

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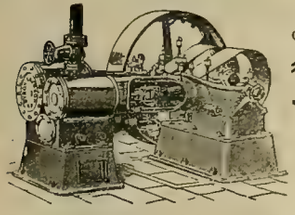

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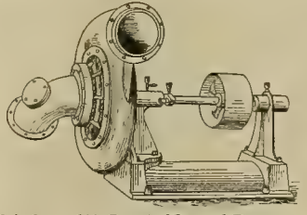
Jackson's GAS —AND— OIL ENGINES.



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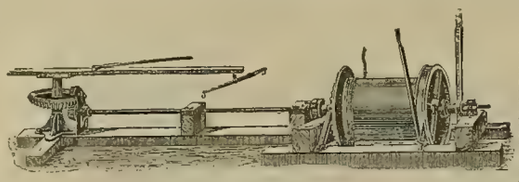

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Triple-Acting Pumps, Deep Well Pumps, Cornish and Jack Head Pumps for Deep Mining, Horse Power Mining Hoists, Water Gate Valves up to 40 inches diameter, and Link Chain Elevators. Pipe and Pipe Fittings at lowest prices. Hydraulic Presses. We also manufacture Cyanide Tanks and Centrifugal Sand Pumps for filling and discharging them. These Pumps work the tailings to perfection and are made to handle small or large quantities.

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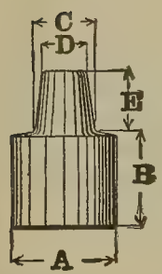

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B=..... "
C=..... "
D=..... "
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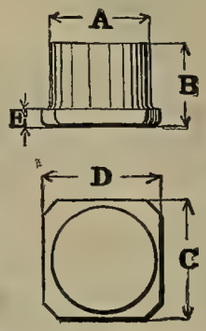

A=.....inches.
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For working the sands from the separating box.

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Works the slimes from the separator.

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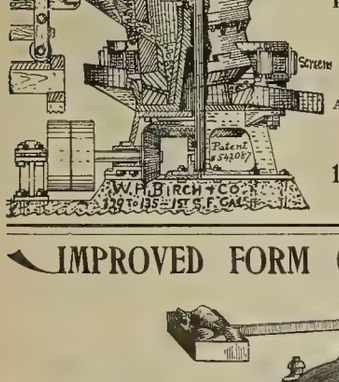

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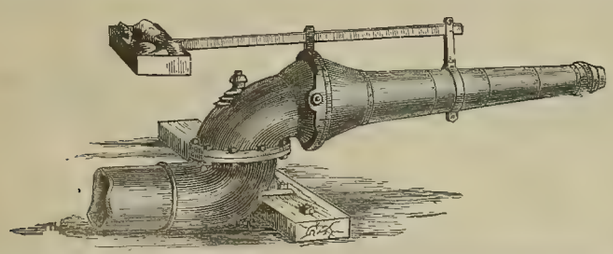

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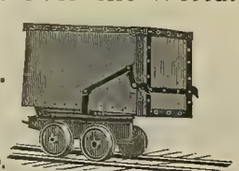

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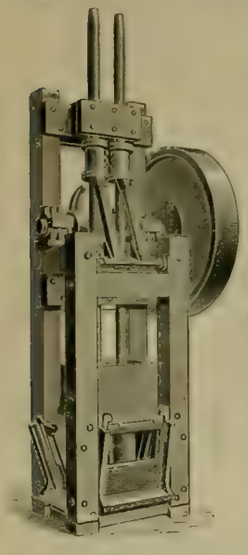

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TRIPLE-DISCHARGE
Two Stamp Mills.

Superior to all other Mills of the same form for the following reasons:

First. Because **Two Stamps** will do **More and Better Work** in a mortar than any other number, as the motion of the stamps causes a discharge at the ends of the mortar, in addition to the front discharge, thereby increasing the stamping capacity, and leaving the pulp of uniform fineness.
Second. They are the cheapest mills to the stamp that were ever offered to miners.
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Fourth. They crush all kinds of ore, rock, cement or conglomerate perfectly.
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Seventh. No skilled labor is required to assemble the parts.
Eighth. The discharge is larger in quantity to the stamp, and the number of drops per minute, (110) of the stamp is greater than any other mill.

Weight of Stamps (each) . . . . . 850 pounds.
Weight of Mill complete . . . . . 7500 "
Power required to drive. . . . . 5 H. P.

CAPACITY, SIX TO TEN TONS PER DAY.

PRICE, $450.00

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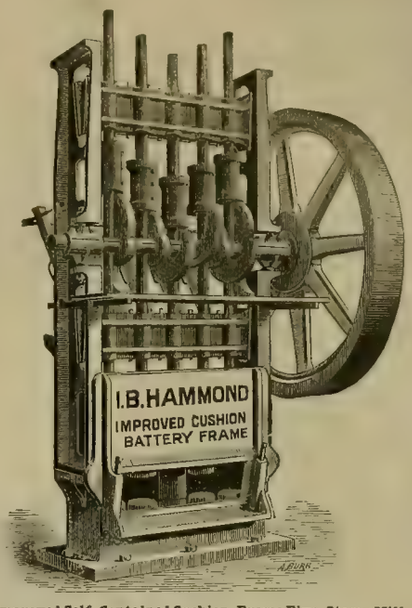

Improved Self-Contained Cushion-Frame Five-Stamp Mill.
Patented in the United States and Foreign Countries.

The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Self-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill.

FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.

SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.

THIRD: The Large Amount of Space Saved.

Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.

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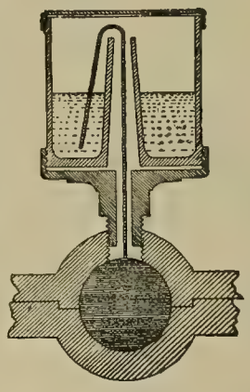
FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

Positively Reduces Oil Bills 75 Per Cent.



THE FINCH OIL CUP.

Frictional vibration by the motion of the shaft against the point of the wire causes the oil to flow, and that this flow is not produced simply by syphonic or capillary action but by frictional vibration is proven by the fact that if the wire does not rest on the shaft then the oil will not flow. When the machinery stops the feed stops, therefore **the Finch Cup is Absolutely Automatic, Feeds Enough Oil and No More, Prevents All Waste, Needs Very Little Attention.**

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UNION GAS ENGINE CO. SAN FRANCISCO, July 19, 1894.

During the past three years we have used your Cups for the crank shaft bearings of our engines, and also on all bearings of shaftings and tools in the shop. Our engines now *require no attention* except to fill the Cups occasionally, and therefore we can cheerfully recommend the Finch Cups to any one as *being the best in the market.*

K. J. McHUGH, 25 New Montgomery St., San Francisco, Cal.
General Agent for Pacific Coast. Send for Circular.

DEWEY & CO., 220 Market St., SAN FRANCISCO,

PATENT SOLICITORS.

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Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class agency. We have able and trustworthy associates and agents in Washington and the capital cities of the principal nations of the world. In connection with our scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of patents already granted, for the purpose of determining the patentability of inventions brought before us enables us to give advice which will save inventors the expense of applying for patents upon inventions which are not new. Circulars and advice sent free on receipt of postage. Address **DEWEY & CO., Patent Agents. 220 Market St., S.F.**

NOTICE TO ORE SHIPPERS.

By shipping your ores to us you can obtain the highest prices paid on competitive bids in the public market, together with a careful and accurate sample, as with our new mill and improved machinery we are able to give perfect satisfaction to all shippers. *Write for our Pocket Reference Book.* The highest cash price paid for gold bullion and old gold. Prompt returns.

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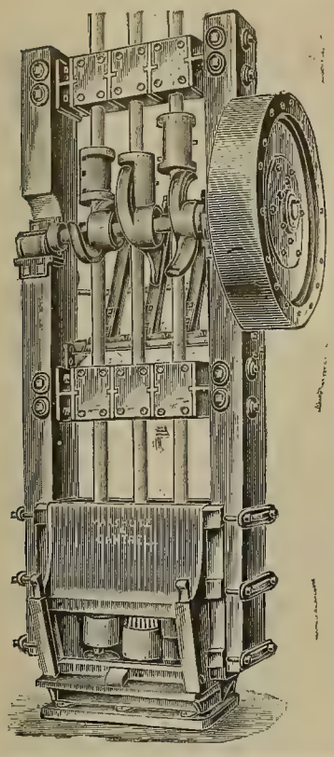
National Iron Works,

N. W. Cor. Main and Howard Sts, San Francisco, Cal.



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IMPROVED PORTABLE HOISTING ENGINES.

Improved Self-Contained Three or Five Stamp Mill,

Saves bill for heavy timbers, millwright and mechanics' labor, and a large amount of space. The term self-contained means a great deal for the mine owner, and can be readily recognized and appreciated in making an estimate for an ordinary plant when the comparative cost is considered.

FIRST: There is saved a large bill for heavy timbers, in many instances obtained at great expense and loss of time.

SECOND: The saving in millwright and mechanics' labor in framing and erecting.

THIRD: The large amount of space saved.

FOURTH: The great saving of freight,

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Mining Machinery.

Stamp Mills

Of the Latest Improved Design for

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VULCAN WIRE ROPEWAYS

For Conveying Ore, Etc.

Vulcan Iron Works,

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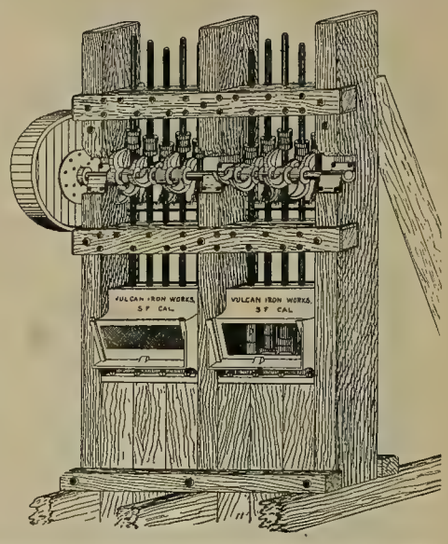

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250 Square Feet, with Nails and Paint Complete.....$4.00

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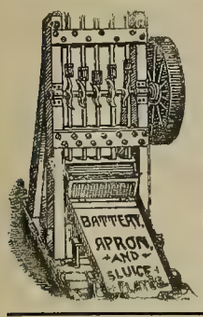

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Silver Plated Copper Amalgam Plates

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GOLD REMOVED FROM OLD PLATES AND REPLATED. Old Plates bought. Get our Reduced Rates. Five thousand orders filled. Twenty-five Medals Awarded.

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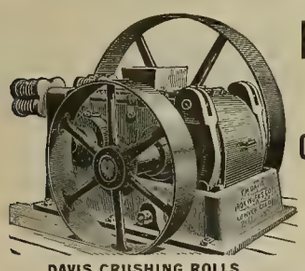

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Concentration, Chlorination, Cyanide and Amalgamation Machinery.

Complete Plants for Ore Treatment

High Class Machinery and Experienced Modern Engineering.

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CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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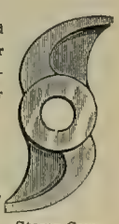

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The Most Modern Mining Equipment

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Current for MINING LOCOMOTIVES, INCANDESCENT LIGHTS, ARC LIGHTS and POWER supplied from THE SAME CIRCUITS.

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MANHATTAN ARC LAMP: Life of 12-Inch Carbon, 150 Hours; Current, 5 Amperes, 2000 Candle Power.

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The McGlew Ore Concentrator Company.

PATENTED SEPTEMBER 19, 1893. CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE. FRANK BARRERE, Secretary and Manager.

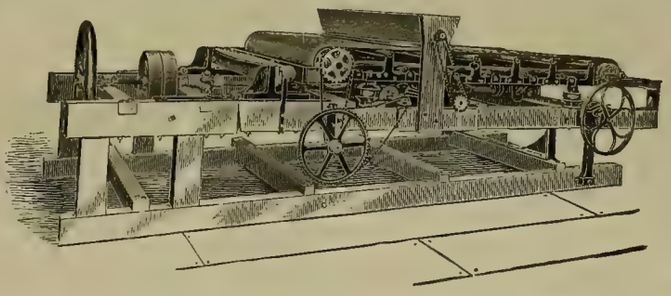
Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

Office, 116 Davis Street.

NINETY-FOUR AND ONE-HALF PER CENT
— SAVED —
ON ORES DIFFICULT TO CONCENTRATE.

A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.
SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION
CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



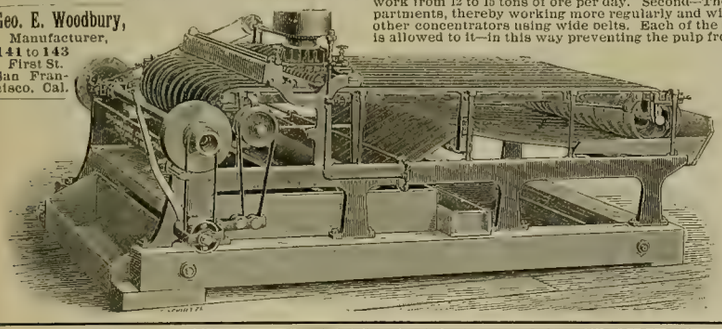
FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.
THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.
Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.
Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.
You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
E. L. BALLOU, Propr. Ballou Reduction Works.

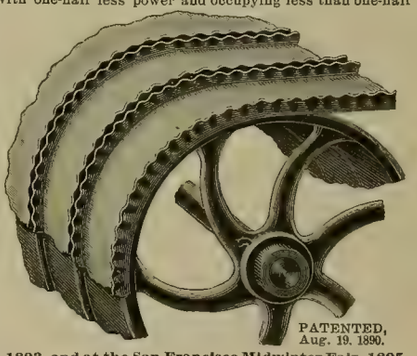
THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THIS CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of best Steel and Wrought Iron. Strong and durable. Price $575 f. o. b. Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS: First—The Improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 12 to 15 tons of ore per day. Second—The machine equalizes the load by several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allowed to it—in this way preventing the pulp from running to the lower side of it, as is the case when a machine becomes out of level where wide belts are used. Third—The belts run on a perfect line, needing no adjustment to prevent their running from side to side, as in other concentrators. Fourth—The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth—The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth—The feed arrangement is perfect. Seventh—The machine is constructed of iron, with steel crank-shaft self-oiling boxes, and everything made in the most thorough manner, enabling it to run with very little attention or wear.

Geo. E. Woodbury, Manufacturer, 141 to 143 First St. San Francisco, Cal.





PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st prize at the World's Columbian Exposition, 1893, and at the San Francisco Midwinter Fair, 1895.

THE GUTTA PERCHA AND RUBBER M'F'G CO.

30 and 32 FREMONT ST., SAN FRANCISCO.

Spadone's Concentrator Belts. Patented.

The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

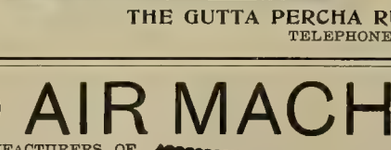


FIG. 1.

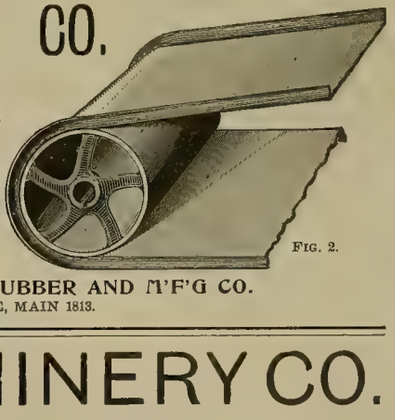


FIG. 2.

We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.

THE GUTTA PERCHA RUBBER AND M'F'G CO.
TELEPHONE, MAIN 1813.

RIX COMPRESSED AIR MACHINERY CO.

MANUFACTURERS OF

AIR COMPRESSORS AND ROCK DRILLS,

OFFICE AND WORKS — 11-13 FIRST STREET, SAN FRANCISCO.

Market Reports.

The Markets.

SAN FRANCISCO, July 2, 1896.

Jobbers report a light call, but not more so than obtains at this season of the year. Two legal holidays in July, and so near together, are against much buying. It is the prevailing opinion that after next week there will set in a steady improvement and a gradual enlarging of orders. With manufacturers there is a continued good feeling, with confidence expressed that this fall will witness more activity than for years, and this, too, in the face of its being a presidential election year. These remarks have more particular reference to foundrymen and iron workers in general. There is a continued good demand for mining machinery and structural material. There is said to be more activity in the manufacture and also remodeling of railroad rolling stock.

The money market is reported easy, with the available surplus fund quite large. The demand is even light for this season of the year. The call for crop-moving purposes is not up to what was expected. The large shipments of fruits to the East will cause considerable money to be disbursed, as will the heavy payments due for interest and dividend. The disbursements on account of the two latter will aggregate large and add still further to surplus funds available for loaning. Considerable money continues to come in for mine purchases. It now looks as if there will be quite an increase in the boom in gold mining this fall and throughout next year. The Eastern money markets are reported quite easy, with a liberal surplus of funds on hand. This will be added to still further by the heavy disbursements, which are always a characterizing feature of the month of July.

New York Silver Prices.

NEW YORK, July 2.—Following are the closing prices for the week:

	London.	N. Y.
Friday	31 9-16	60⅛
Saturday	31 9-16	69
Monday	31½	68⅞
Tuesday	31½	68⅞
Wednesday	31 7-16	68¾
Thursday	31 7-16	68¾

	Copper.	Lead.	Iron.	Tin.
Friday	11 87½	3 00	11 50@12 50	13 50
Saturday	11 93½	3 00	11 50@12 50	13 50
Monday	11 50	3 00	10 50@13 00	13 40
Tuesday	11 25	3 02½	10 50@13 00	13 40
Wednesday	11 25	3 00	10 50@13 00	13 45

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½
New York Telegraphic Transfer	15
London Bankers' 60 days	$4.88¼
London Merchants	$4.88¾
London Sight Bankers	$4.89¼
Refined Silver, per oz., 1000 fine	62⅝
Mexican Dollars	54@55c

SILVER.—The Eastern and European markets have sold slightly lower, but this was to have been expected after the most urgent wants had been met. There seems to be a growing impression that market values will rule much higher before the fall months pass. What this opinion is based on it is difficult to say, unless there is to be a silver election campaign, which might stimulate speculative buying. There is another fact, viz: the increasing production of gold throughout the world will stimulate business, particularly if it should increase to over $200,000,000 this year. Among the first commodities to rise in price as the effect of this will be silver, because of the increased use of it for subsidiary purposes with the increase in business prosperity and confidence. In our market the inquiry is light for the time being. The last steamer for Hongkong took out $27,000 in bullion.

MEXICAN DOLLARS.—The demand is light. The last steamer for Hongkong took out 11,834 dollars. The market closed easier.

COPPER.—The market is quiet, but firm. The New York market has shaded off slightly. According to James Lewis & Sons of Liverpool, for the first five months of the calendar year the increased consumption of England, Germany and France is at the rate of 62,157 tons per annum. Last year the production of the world was about 8,000 tons less than the consumption. This year the production of the world (allowing for an increase of 35,000 tons), promises to be fully 35,000 tons less than the consumption, leaving a stock of about 8,000 tons at the end of the year. So many orders have already been booked by consumers for delivery over the next six months, that a much higher range in prices, which seems inevitable, will have little effect on consumption, while production cannot be materially increased for some time, as that of the American mines is dependent on the extent of their concentrating and smelting plant, which it would take many months to enlarge. The paper read by the Constructor-in-Chief of the Imperial German navy at the meeting of the Institution of Naval Architects will probably lead to the general substitution of electricity for steam as the chief motive power on board war and other ships.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The market is steady with a fair export demand.

The market is quoted as follows:

Home trade, per flask	37 00
Distant points up north	36 25@37 00
West coast of Mexico, for export	32 50

ANTIMONY.—The demand is slow, with the market easy at 8@9c in a jobbing way. New York mail advices quote 7½@7¾c for Cookson's, 6½c for Hallett's and 6½c for Japanese, from store.

LEAD.—The market is essentially unchanged. The New York market is reported quiet with consumers and dealers indifferent, while speculators manifest only a curious interest.

Pig	3 75	@	4 00
Bar	—	@	4 15
Sheet	—	@	5 50
Pipe	—	@	4 75

SHOT.—The market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—The market is dull and in buyers' favor for both pig and plate. The East reports a quiet market with consumers not anticipating their wants.

The market is quoted as follows:

Pig, per lb	14½c
Plate, I C coke, heavy, per box	$4 25
" " " light, "	4 10

BORAX.—The market is quoted as follows

Refined, in car lots	6½
Refined, in sacks	5⅞
Powdered, in car lots	6⅛
Concentrated, "	5⅝

POWDER.—While the East reports a firm market at recent advances, our market is unchanged. The demand here is unusually large, mostly for mining purposes.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, "	8½c

COAL.—There is absolutely nothing new to report in our market since our last review.

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 00@ 5 50
Coos Bay	—@ 4 50
Cannel	—@ 8 50
Egg, hard	—@11 50
Wallsend	—@ 7 00
Scotch Splint	—@ 7 50
Brymbo	—@ 7 50

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	—
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	—	—	—
English, to load	9 00	@	10 00
" spot, in bulk	—	@	11 00
" in sacks	—	@	12 00
Cumberland	—	@	—

LUMBER.—There is a fair home and export demand.

The market is quoted in this city from dock or yards as follows:

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—Jobbers report a fair demand at quotations.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 22½
" jobbing, " "	3 35
Cut, carloads, " "	2 97½
" jobbing, " "	3 10

Mining Share Market.

SAN FRANCISCO, July 2, 1896.

The market has been quieter, with prices generally lower, particularly for shares in the middle and north-end group. The decline was fully 25 per cent in all except Con. Virginia and the Gold Hill shares. These only went off from the best figure of the week about 15 per cent. At the lower prices the Gold Hills rallied from 10 to 25 per cent. At the lower figures there was a general unloading of margins. Under these sales the market was made to look so disgustingly broken up that few outsiders had the temerity to buy, consequently the inside pool secured a large line. A singular feature of the down market has been the way in which it was made to appear as if it was going to pieces on each decline. This demoralized appearance enabled the pool to get about all the shares sold by outsiders, and yet they are, seemingly, not satisfied, for points are out that there will be still lower figures after the holidays, after which there will be another deal. In the buying the pool has been aided by bear write-ups and well distributed bear points by cappers and others. While the writer does not claim to know how the market will be worked yet, judging from the work done and that is being done in the mines, the shares of the north-end and Gold Hill mines are selling below what they should from a speculative standpoint. They have never failed in rallying and bringing a good profit to those who bought at around present figures and did not hold in expectation of bonanza prices. There is a belief in well-informed circles that we will soon see another four or five dollar deal and that Chollar will not be the leader. They look for several of these little deals. If this proves correct, and the work going on in the mines looks like it, then there will be more or less activity throughout the year, and those who take their turns will more than likely come out ahead.

No assessment was levied this week, but, if reports are correct, there are from six to ten to come on during the current month. The mines cannot be worked on gas (this has no reference to Con. Virginia), for it takes money to pay miners, officers and others.

The news from the Comstock mines points to more activity than for several years. More men are being added, with larger additions to the working forces expected in this and the coming month. Of necessity this will depend largely on how the pool has the shares, for it is not at all likely that it will be done if the public has the bulk, unless there has been a radical change in working the mines, according to how the shares are held. In Alta they will soon be in position for better exploiting, and as the company has money on hand better things ought to come from it. So far as the public are advised no work is being done in Confidence, but in Overman more men have been put on to follow up the seams of ore on the 900-foot level. The official letter from Seg. Belcher reports the raising of fair grade ore—assaying around $20 a ton. Belcher has milled 425 tons of ore and is raising about 50 tons each week. No particulars are made public as to work going on in these two mines. At date of last weekly letter there was still 15 feet in the upraise from the 700-foot level so as to connect with the 600-foot level. When this is done good ventilation will have been secured, which will enable the company to extract, raise and mill the gold ore between these two levels. It will more than pay expenses. It is stated that quite an increase will be made on or about the 20th of this month in the number of miners at work in Crown Point and two or three other Gold Hill mines. In Confidence they are still raising for surface connection for better ventilation so as to work Challenge and Confidence to better advantage. In Con. Imperial they are still pushing ahead to joint Confidence, Challenge and Con. Imperial west crossdrift. Work is also being done in another west crossdrift. In Alpha they are still at work on the 500-foot level. In Bullion work is continued in the long west crossdrift. Gould & Curry and Best & Belcher are running a joint east crossdrift from the Bonner shaft. Advices from Con. Virginia report an improvement in the south drift towards the Best & Belcher, on the 1650-foot level. They are about 175 feet from the south boundary line of Con. Virginia. They are again extracting ore. The bullion return from the ore milled was $34,756. In Ophir the ore found on the central tunnel has improved in value, but it is too low grade yet. Work is still being pushed to the west on the 1000-foot level, as it is in Mexican. In the latter mine the formation is said to have improved. The work under way in Union, Sierra Nevada, Utah and Andes is about the same as heretofore reported. In the middle mines the work in Potosi and Chollar is on same levels heretofore reported, with no particular change noted. They are raising fair grade ore each week from the latter mine. In Hale & Norcross they have made connection between two levels for better working. They are still running for ore found in Savage. A few tons of ore are raised each week. The official letter from Savage reports that 182 cars of ore were raised, assaying over $28, and 150 tons had been milled which gave over $29, battery assay. They have a large quantity of this ore still in sight.

From the Brunswick our advices are to the effect that more active work is being done than at any time since the lode came to the front. The official letter from Occidental reports that on the 750-foot level $14 gold ore was found in the south drift and $20 gold ore in the north drift. This shows that the ore continues downward. Its width was not stated. In Hale & Norcross they broke the record in drift mining, 48 feet being made in a week. The south drift got up to the Chollar line on the 300-foot level yesterday when the latter company took up the work with the same number of men. It is reported that 100 feet will be run before a cross drift is started, but of its correctness we are not advised. The north drift on the same level in Hale & Norcross is being extended toward the Savage line. The work in the latter mine is on the same level and same direction reported last week. In Gould & Curry the most important work is being done. It is closely watched by mining men and good results are predicted with confidence by those in position to know. The joint shaft in Best & Belcher is still being sunk. In Chollar they are running an east cross drift from the 200-foot level drift.

From the Bodie mines the news is unimportant. Work is being carried on at several points in Bodie, but the ore encountered is reported low grade. More or less exploiting work is being done in Mono and Bulwer.

The following illustrates the changes of the week:

Mines.	June 25.	July 2.
Alpha	$ 13	$ 10
Alta Consolidated	13	10
Andes	31	32
Belcher	49	49
Best & Belcher	80	75
Bodie	47	40
Bullion	22	18
Challenge	32	35
Chollar	2 75	2 20
Confidence		99
Consolidated California and Virginia	1 90	1 90
Consolidated New York		
Crown Point	48	52
Exchequer	05	05
Gould & Curry	1 35	98
Hale & Norcross	1 70	1 25
Justice		05
Mexican	74	66
Ophir	1 30	1 15
Overman	23	
Potosi	1 25	1 05
Savage	1 20	88
Sierra Nevada	60	55
Union	66	53
Utah	09	09
Yellow Jacket	49	45

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Bullion Con G M Co, Cal	8	15c	June 16.	July 20.	Aug 11 C A Grow, Mills Building
Central Eureka M Co, Cal	1	3c	May 16.	June 22.	July 18 W Van Bokkelen, 320 Sansome
Channel Bend M Co, Cal	3	5c	June 23.	July 31.	Aug 22 J P Langhorne, 39 Sutter
Chollar M Co, Nev	42	25c	June 9.	July 14.	Aug 4 C E Elliot, 309 Montgomery
Horseshoe Bar Con M Co, Cal	4	50c	May 12.	June 22.	July 14 D M Kent, 330 Pine
Kentuck Con, Nev	12	5c	June 16.	July 22.	Aug 12 Aug Waterman, 309 Montgomery
Mono G M Co, Cal	37	10c	June 2.	July 6.	July 27 M E Willis, 309 Montgomery
Mt Diablo M & M Co, Nev	4	5c	May 21.	July 2.	July 23 R W Heath, 318 Pine
Nimshew G M Co, Cal	1	3c	June 5.	July 13.	Aug 3 C D Cook, Mission St Pier No. 1
Occidental Con M Co, Nev	23	15c	June 2.	July 7.	July 28 A K Durbrow, 309 Montgomery
Old Flag M Co, Cal	3	2c	May 11.	June 18.	July 6 F L Olmsted, 315 Montgomery
Reward G M Co, Cal	13	3c	June 1.	July 2.	July 20 S W Backus, Mills Bldg
Silver King M Co, Arizona	14	25c	May 7.	June 16.	July 14 J W Frew, 310 Pine
Ybarra G M Co, Mexico	4	15c	May 21.	June 21.	July 9 Jas Coffin 132 Market

San Francisco Stock Board Sales.

SAN FRANCISCO, July 2, 1896

9:30 A. M. SESSION.

200 Andes	32	700 Mexican	66
500 Best & Belcher	75	100 Mono	03
400 Bodie	40	200 Occidental	74
100 Bullion	18	100	75
550 Chollar	2 15	250 Ophir	1 15
200	2 20	200 Potosi	1 00
100 Con Cal & Va	1 85	150 Savage	87
50	1 90	50	88
50 Challenge	35	100 Union	53
200 Gould & Curry	97	200 Utah	09
100	98	200 Yellow Jacket	44
150 H. & N	1 25	550	45

SECOND SESSION—2:30 P. M.

200 Mexican	65	100 Alpha	10
50 Gould & Curry	96	200 Belcher	49
100 Best & Belcher	72	100 Conndence	99
200	70	250 Sierra Nevada	55
100 Savage	88	300 Bullion	18
450 Chollar	2 15	500 Exchequer	05
300 Potosi	1 05	300 Seg Belcher	13
100 H. & N	1 20	300 Justice	05
150	1 25	200 Union	52
100 Crown Point	51	100 Alta	10
100	52	150 Challenge	32
1300 Yellow Jacket	45	50 Occidental	70
50	44	250 Scorpion	06

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THE CALIFORNIA DEBRIS COMMISSION having received applications from the following persons to mine by the hydraulic process, viz.: In El Dorado County: John J. Flora, in the Buckeye Hill Mine, near Volcanoville, to deposit tailings in Buckeye Canyon; Giacomo Varozza, in the Try Again Mine, near Placerville, to deposit tailings in a ravine below the mine; Giovanni Raffetto, in the Raffetto Mine, near Placerville, to deposit tailings in South Weber Creek; J. R. Vandergrift, in the Maylone Mine, near Indian Diggings, to deposit tailings in Indian Diggings Creek. In Tuolumne County: F. W. Eaton, in the Cook Gravel Mine, near Montezuma, to deposit tailings in State Gulch, A. P. Scheld, in the Marlow Mine, near Sonora, to deposit tailings in Turn Back Creek. In Nevada County: Eber A. Sanford, in the Deer Creek Mine, near Mooney's Flat, to deposit tailings in an old pit. In Plumas County: California Gold Mining and Investment Co., in their claim, near Taylorville, to deposit tailings in Foreman Canyon; Henry W. Orr, in the Slate Creek Mine, near Spanish Ranch, to deposit tailings in the Hartley Fork of Slate Creek. In Placer County: Barney Cavanaugh, in the Parke and Brown Mine near Ball Mountain, to deposit tailings in a ravine; Shirley Mining Co., in the Shirley Gravel Mine, near Michigan Bluff, to deposit tailings in Dutch Gulch and Poor Man's Creek; and William Phillips, in the Phillips Claim, near Colfax, to deposit tailings in Dry Creek—gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on July 20th, 1896, at 1:30 P. M.

Sale of the De Lamar Mine.

A Salt Lake, Utah, dispatch says an English syndicate, represented by Charles M. Rolker, has bought the De Lamar gold mine at De Lamar, Nev., and Mr. Rolker is now in Salt Lake waiting for the legal transfer before assuming control of the property.

Mr. Rolker made an exhaustive examination of the mine for the new owners and the purchase followed. In his report Mr. Rolker shows that $200,000 had been spent on the property in equipment, water supply and electric plant. Ten thousand tons of ore have been milled from the mine, producing $650,000 in less than five years. Captain De Lamar paid $200,000 originally for the property.

It now has 20,000 feet of development nearly all in ore and is producing about $200,000 a year in gold bullion. The ore is handled by an electric tramway and the bullion is hauled to Milford, Utah, the terminus of the Union Pacific, 170 miles by stage with armed guards. The price of the property is not definitely known, but it is believed to be about $3,000,000.

THE action of the Rothschilds in picking up copper holdings is explained by the statement that a recent discovery made in Europe shows that copper is superior to steel for making armor plates for war vessels, having greater powers of resistance. As the Rothschilds will furnish the money wherewith to build the ships, but it is natural that they should furnish the copper, and their efforts in that direction show that they are prepared to pay something handsome for the control of the copper output of the world. The explanation, though plausible, is very unlikely.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JUNE 23, 1896.

562,688.—FRUIT PICKER, ETC.—Baisley & Decker, Los Angeles, Cal.
562,510.—OAR—E. B. Cleaveland, Snohomish, Wash.
562,451.—WASHING UTENSIL—Mary M. Davis, South Pasadena, Cal.
562,716.—STEP LADDER—C. H. Dyar, Ontario, Cal.
562,784.—LEGGING—C. Fisher, S. F.
562,742.—DENTAL ENGINE—O. H. & A. F. Pieper, San Jose, Cal.
562,418.—JAR SEALER—S. B. Ragatz, Los Angeles, Cal.
562,680.—WRENCH—A. Willons, Redlands, Cal.
25,665.—DESIGN FOR CAN—E. H. James, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

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Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Silver Star Mining District, Stores county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 20 day of June, 1896, an assessment (No 23 of fifteen cents (15c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No 69 Nevada block, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of July, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on TUESDAY the 28th day of July, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURROW, Secretary.

Office, Room No 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

NIMSHEW GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Nimshew, Butte county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 5th day of June, 1896, an assessment (No 1) of Three cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Mission Pier, No. 1, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of July, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 3d day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

C. D. COOK, Secretary.

Office, Mission St. Pier, No. 1, San Francisco, California.

MARGUERITE GOLD MINING AND MILL CO. Location of principal place of business, San Francisco, California; location of works, Auburn, Placer county, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 18th day of June, 1896, an assessment (No. 3) of Ten Cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 237 12th St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of July, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on FRIDAY, the 28th day of August, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

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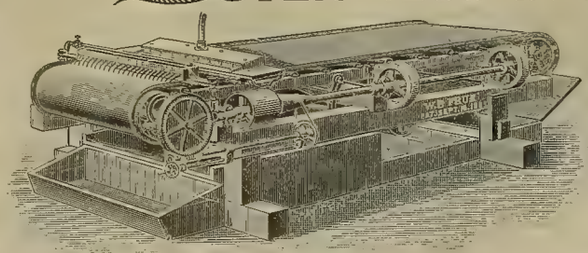

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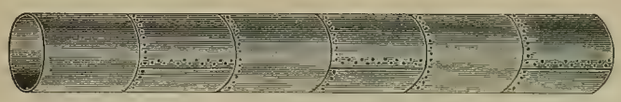

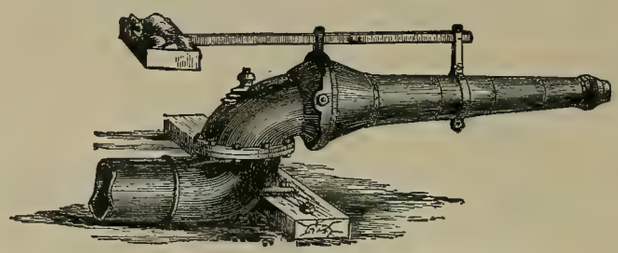

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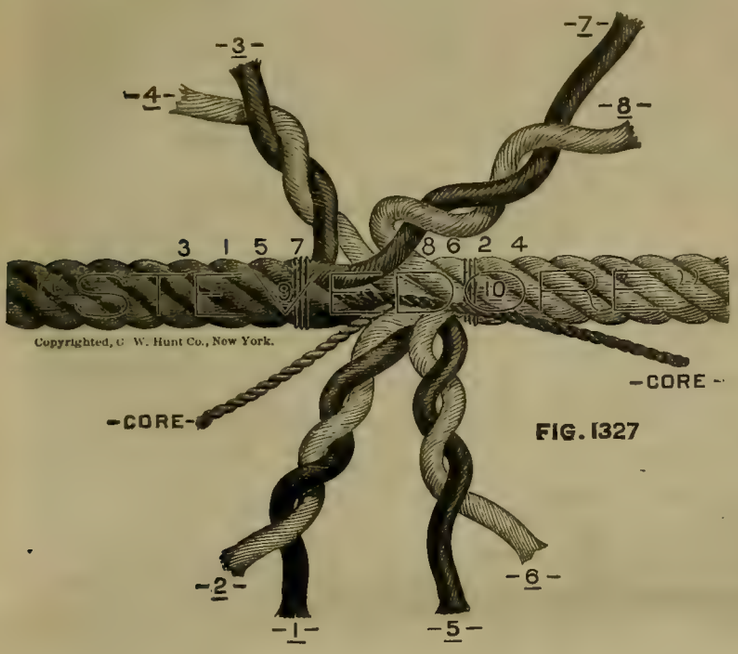

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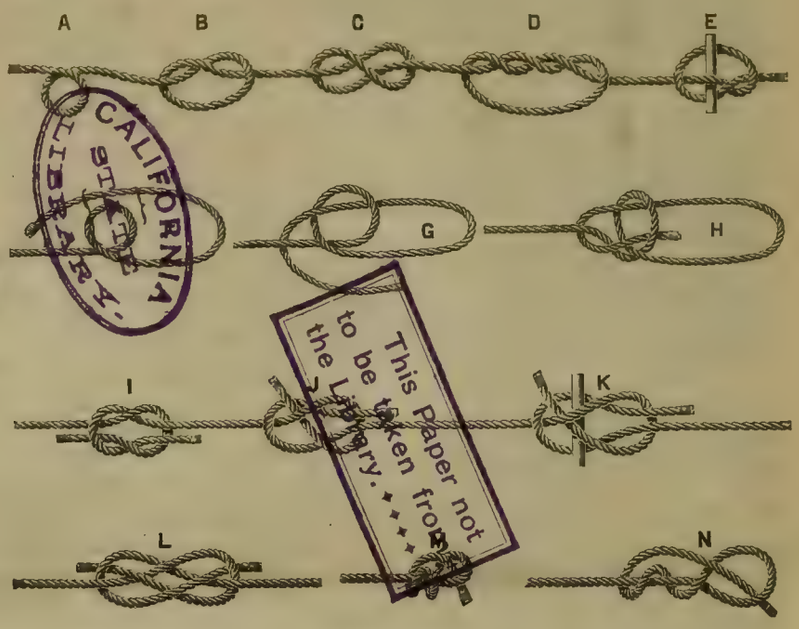

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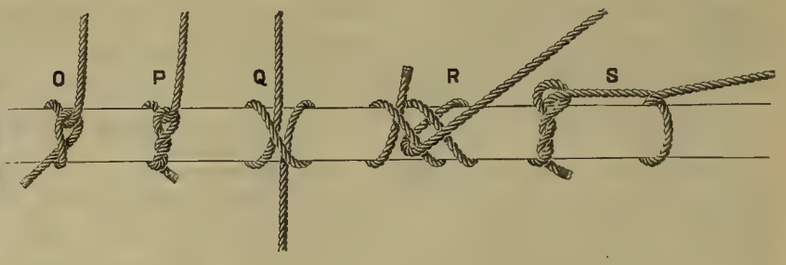

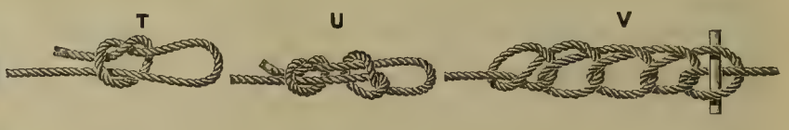

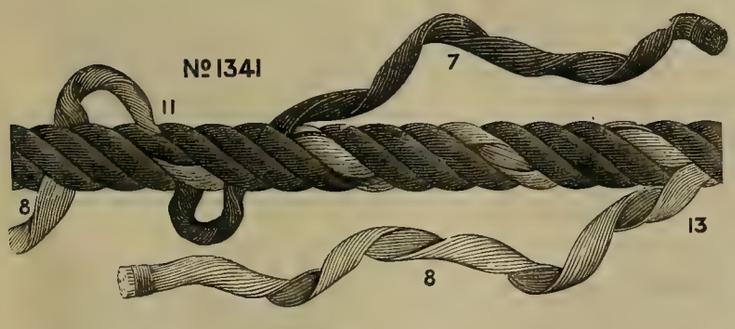

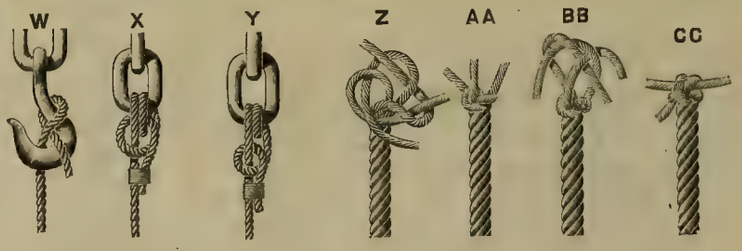

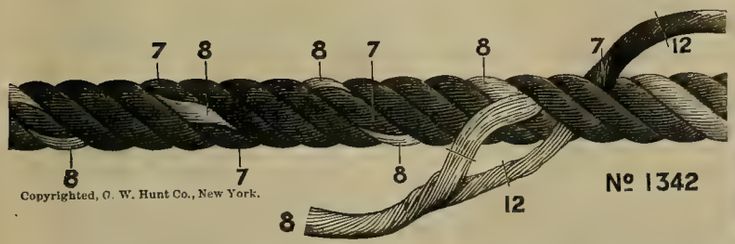

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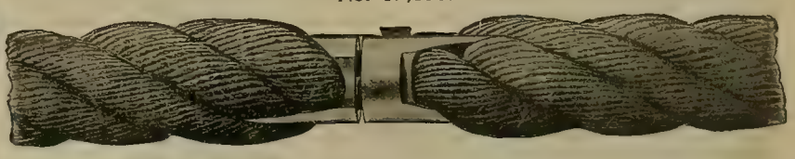

KNOTS AND SPLICES IN MANILA ROPE. (*See page 29.*)

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J. F. HALLORAN.....General Manager

San Francisco, July 11, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Knots and Splices in Manila Rope, 25. Part of the Young Sequoia Gigantea Grove at the Chico Forestry Station, 28.

EDITORIAL.—Majorities in the Coming Presidential Election; Gold Discoveries on the Desert; Mining the Backbone of the Country's Prosperity; Decision by the U. S. Supreme Court; Individual Owners of Gold Mines; Mining in Butte County; Other Mercur Districts; Improvements in Gold Milling, 26.

ELECTRICAL PROGRESS.—Electricity Direct from Coal; Uses of Electricity in Metallurgy, 29.

SCIENTIFIC PROGRESS.—Mysteries of Science; Mountain Ranges; A New Respirator; Electricity for Whaling; The New Highway, 30.

MECHANICAL PROGRESS.—Air Hoist Table: A Large Pair of Turbines; Fly Wheel Calculations; Blasting Under Water; Torpedo Destroyer Desperate; New Method of Preparing Alloys; Sonorousness of Aluminum; Iron and Steel Tools; Metals Capable of Combining with Argon, 30.

PRACTICAL INFORMATION.—Nervous Strain of Railway Work; Why Stone Walls are Damp; Celery a Cure for Rheumatism; Definite Understanding Between Parties in Commercial Transactions; Chilly Feeling; Cracking of Rubber; The Influence of Fatigue Upon the Nervous System, 31.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 34-35.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 42.

MISCELLANEOUS.—Concentrates; Status of the Miner—Past and Present, 27. The Old Prospector; Young Sequoias; Keeping Copper Plates Bright, 28. Knots and Splices in Manila Rope, 29. California Mines and Miners, 31. Personal; Recent California Mining Incorporations; Recently Declared Mining Dividends, 35. Coast Industrial Notes; Commercial Paragraphs, 36. Notices of Recent Patents, 38.

IN the coming presidential election if all the men who believe in protection will vote for the protection candidate he will have a tremendous majority. If all who believe in free silver vote for one and the same free silver candidate he will have a majority.

RECENT reports of gold discoveries "on the desert" and elsewhere in arid sections of southern California direct renewed attention to the profitable work of bringing water on gold placer ground. The "dry-washer," while an ingenious device practicable on a small scale, cannot handle pay dirt in large quantities as profitably as hydraulicking can. The counties of San Diego, San Bernardino, Riverside, Kern and Ventura have given abundant evidence of the profit possible by the bringing of water on dry gold placer ground, a project that promises return second only to the product itself.

IN these days of shrinkage in real estate values, stagnation in the price and sale of all agricultural products, loss in railroading and general lack of profit in the business world it is noticeable that the one business that men have declared less creditable and more of a gamble than anything else is the one business that gives the greatest promise of profit. Miners are to-day men who keep going, pay their bills and are living through the hard times in a way to compare favorably with those who have constantly decried and derided them, thus showing what has often been said that the backbone of the country's prosperity is the mining of the precious metals.

THE United States Supreme Court has made a decision in the case of Haws vs. Victoria Copper Mining Co., reversing all the precedents of older decisions and the customary practice of miners in locating mining claims. It has held that a valid mining location may be made without marking the boundaries on the ground or even of posting a notice on the ground located. The practical effect of this adds additional uncertainty to the mining titles based on location only. Under it old locations supposed to be invalid by reason of not being marked on the ground can be revived, to the injury of locators who have in good faith definitely marked their claims. Despite the decision, it is preferable that locators should carefully mark their claims out on the ground so that they can be readily traced and identified as the boundaries of a mining location. Also, the notice should preferably be posted on the ground and maintained there. This course will certainly be a protection against any subsequent locator, though, under the decision referred to, it would not avail against a prior locator who did not mark his claim boundaries or post any notice on the claim. Another point on which the decision bears is the location of two or more claims on the same lode by the same locator. This is inferentially validated. Also, two or more adjoining placer locations may be made by the same locator—in fact, there is no limit to the amount of territory one locator can tie up without incurring any expense except the minor one of recording, from January 1st of one year to the 31st of December of the following year. Is Senator Stewart going to live forever?

Improvement in Gold Milling.

In a late number of this paper we quoted from an article by H. M. Chance in the *Engineering Magazine*. For the most part Mr. Chance's paper is devoted to a review of what has been accomplished by new methods of treatment substituted for or applied after the ore has passed through a stamp mill, but he very properly indicates the first step to be the determination of what can be done in the stamp mill itself, and by tests and trial crushing through different screen meshes. Mr. Chance's paper, while it states conclusions, does not give the details of methods, and it is believed that the following, in view of the importance of the subject, will be found practically useful to gold miners.

In the stamp mill additional, besides the improvement made by narrowing the battery, lowering the discharge, increasing the rapidity and diminishing the height of the drop, and in preliminary fine crushing in a rock breaker, the weight of the stamp itself is an important factor. The stamp head duty has something more than a direct ratio of increase with increase of weight, and the amount of mill labor required is measured by the number of stamps, not by the weight. In other words, no more labor is required for, say, twenty stamps weighing 1000 lbs. each than is required for the same number of stamps weighing 700 lbs., yet the former crush half again as much ore as the latter, correspondingly reducing the labor item of cost of crushing per ton. It is therefore preferable in mill construction to concentrate the required total stamp head weight into the smallest possible number of heads. It effects a direct economy of operation very considerable in amount, and is, if anything, measurably less costly in initial installation. It is hardly possible to make a mistake in the effort to secure this economy.

Any millman can make the simple tests and estimate the data for fixing the economic maximum of screen mesh and rate of stamp head crushing for the particular ore he is treating. With two or more batteries in the mill the trial runs can be made by using the compared screens along side of each other thus insuring uniformity in the conditions of the trial, which should extend over sufficient time to further eliminate the effect of incidental inequalities. For each trial run and different screen mesh the millman should keep data as follows: 1.—The exact time of drop of the stamps of each battery and of the unavoidably lost time.—2. The amount of ore crushed by each battery during the run. 3.—The value of the retorted bullion obtained from each battery and plates during the run. 4.—The value of the concentrates saved for each battery. 5.—Taking as a unit, the finest screen mesh of the test, tailing samples from the batteries using the other screens should be screened on the finest screen and the percentages of coarse and fine tailings noted. Each should be assayed separately and the assays noted in connection with the percentages. Examination should be made of the tailings to determine whether or not concentratable material is being lost. The assays of the fine tailings should be the same, independent of the rate of stamping and the only additional loss mechanical, in the coarse particles. It should be noted that it may be necessary to increase the plate areas with increased discharge. 6.—The cost of screens used for each battery should be noted. From the preceding data the following ton figures would then be calculated. 1.—Number of tons of ore crushed per 24 hours (actual time of stamp drop and unavoidable lost time per stamp head). 2.—The yield per ton of ore of gold from battery and plates. 3.—The yield per ton of ore of gold from concentrates. 4.—The loss per ton of ore in tailings passing through the finest mesh screen. 5.—The loss per ton of ore in the coarse tailings in excess of what it would be if fine crushed. 6.—Cost of screens per ton of ore. 7.—The total labor, power and supply cost of milling (exclusive of screens) divided by the total number of stamps dropped for units of 24 hours determined as above gives the cost of operation per stamp head, which in turn divided by the stamp duty with each screen mesh gives the cost of treatment per ton. 8.—From the preceding the net profit margin per ton of the milling. The point of highest economic efficency is then readily determinable from comparison. In making these comparative tests the precaution should be taken not to overload the concentrating plants with pulp from the coarser crushing batteries. As a general proposition increasing the battery discharge requires corresponding increase in the concentrating plant.

Where auriferous gravel is stamped the tests to determine the point of highest economic efficiency or largest profit margin are simpler, no account having to be taken of concentrates. It is suggested that more often than otherwise auriferous gravel is crushed too coarse and that in nearly all such mills the profit margin is possible of increase.

THE possibilities of there being other Mercur districts awaiting discovery and development is worth consideration. Nevada, California and Oregon all have localities in which there is a general identity of geological conditions and similarity of mineral deposits. Steamboat Springs, in Washoe county, Nevada, are the dying out activities of the solfataric action to which may be referred the formation of adjacent cinnabar, sulphur and alumina deposits. There is nothing unreasonable in the supposition that a deposit of gold has accompanied the cinnabar and that somewhere in the deposits made or forming the former will be found. There is a similarity of geological conditions to the Mercur deposits, also to the deposits bearing gold and cinnabar in Colusa County, Cal., at the Manzanita and adjacent mines, and also to the conglomerate carrying gold and cinnabar found in the Golden Fleece mine, near Ashland, in Jackson county, Oregon. In this latter deposit granite is the underlying country rock on which rests conglomerate and sandstone strata. The conglomerate being comparatively permeable mineralized waters have deposited cinnabar and gold all through it instead of in distinct veins or seams. There is an opportunity for some prospecting in this last deposit. Except in the Golden Fleece, only placers from its erosion have been worked.

FROM the local papers Butte county is evidently receiving its share of the impetus gold mining is experiencing in California. Quartz, drift and river mining are looking remarkably well, increasing in number of separate operations, in the number of men employed and the gold output. The latter has doubled in the last six years. Not the least promising feature of the advance is the permanence and prosperity of the quartz mines carrying their gold in sulphurets. This is the industry of Forbestown district, where the success of the Gold Bank mine has demonstrated the values that await capital and intelligence in the sulphuret gold ores. In drift mining, also, Butte county has vast dormant possibilities. On the Magalia ridge there are miles of buried channels untouched and unprospected. This county is certainly promising enough to justify the expense of the comprehensive surveys and maps which in Placer and Nevada counties have so materially aided the mine owners in locating the buried wealth of the ancient rivers.

THE individual owners of big paying gold mines can be counted on the fingers. As a rule a large paying concern is owned and operated by a company. The plain reason is that, no matter how rich the property may be, rarely can the discoverer or any one man put up the necessary money to develop and operate the mine till its richness is established and it is a steady dividend producer. The mine may be a good one, the property well worth developing, but no matter how thoroughly this may be understood by its discoverer or individual owner, he can do, ordinarily, nothing without the aid of outside capital. And even in the rare cases where the owner of a mine has the money to develop it it takes more than he can afford to put into any one project. Because of this nearly every mine of any consequence is owned and operated by a company, a co-operative concern that jointly puts up enough to develop the property, doing what few men singly could or would do.

Concentrates.

THE Tamarack, Mich., copper mine has two vertical shafts each 4450 feet deep.

SPAIN has pawned her quicksilver mines for 100,000,000 pesetas to the Rothschilds and proposes to be ready for war.

ABOUT 200 men are employed by the Mountain Mines Co. at Keswick, Shasta Co., on railroad work. The smelter is still idle.

THE comparatively rare mineral, Maraposite, is found in large quantities in the Marguerite quartz mine at Auburn, Placer Co.

"A LONG STRIKE" is the present one at Leadville, Colorado, the demand for $3 per day being but one of the local complications still unsettled.

AN incendiary fire destroyed the chlorine works of the Consolidated Mining and Milling Company at Deadwood, S. D., last Monday; loss, $100,000.

INQUIRY is being made for large quantities of quartz-mill tailings. Miners having such tailings might derive substantial advantage by letting the fact become known.

AT Lead, South Dakota, in June there were 48,214 tons ore milled; Homestake, 100 stamps, 10,500 tons; Highland, 160 stamps, 14,054 tons; Star, 200 stamps, 22,660 tons.

THE third edition of that popular work Aaron's assaying, Part I, appeared last week. About the last life work of its late distinguished author was the revision and rewriting of this edition.

THE copper product of the Kearsarge, Mich., Copper Mining Co. is stated to cost 9.22 cents per pound. Working under more favorable conditions, the Tamarack Mining Co. of that State produces refined copper at a total cost of 5.18 cents per pound at the mine.

A RATHER exceptional accident occurred in the Independence mine at Grass Valley this week, fortunately injuring no one. While lowering the cage with a car on it the water wheel broke, followed by the breaking of the cable as soon as the brake was applied.

THE Gold Bank mill, at Forbestown, Butte Co., with 40 stamps, crushes 143 tons every 24 hours, an average per head of 3.575 tons. This is a close approximation to the average practice in South Africa, and is considerably in excess of the average in this State.

THE Oregon Railway & Navigation Company was sold at Fairview, Or., last Thursday, to Marcus, Beeman and Fairchild, purchasing committee appointed to buy the road for the reorganization committee, for $9,437,250, in pursuance of a plan of reorganization considered by bondholders.

THE total dividends paid in the first half of 1896 by the stock companies of Cripple Creek are: Portland, $120,000; Moose, $22,000; Victor, $120,000; Union, $48,000; Isabella, $112,500; Gold and Globe, $23,250; Elkton, $20,000; C. O. D., $5,000; Princess, $20,000; Moon-Anchor, $18,000; total, $508,750.

CALIFORNIANS should not stampede at every newspaper mention of distant mining districts as a poor man's camp, with prospects paying from the surface down. Such mines and localities are as common in California as anywhere else, as the large annual gold production by small mines proves.

"THE Silver King," "The Silver Queen," etc., of the halcyon days of silver mining are no longer so numerous. They have given place to "The Golden King" and Queen, and sometimes the Jack. The names are, however, a little overused. In Butte Co., this State, there are two "Golden King" mines and three "Golden Queens."

A COMPENDIUM of the mining decisions of the California courts in mining cases would be a valuable book for our miners. The State mining statutes are not so extended as to require compilation as has been done in Montana and Arizona, and all our local laws are practically made by the decisions made on the U. S. Statutes.

THE high flume carrying the Miocene ditch between the two Table mountains, near Oroville, fell last week. It will not likely be rebuilt, as the water supply of the ditch now used for irrigation can be utilized equally well below the break through the Hendricks ditch and the Magalia ditch. The high flume was only necessary when the water was used for hydraulic mining at Oroville.

ACTING Secretary of the Interior Reynolds has apportioned the $325,000 appropriated at the last session of Congress for surveys. Under this division California's Surveyor-General is allowed $15,000, Nevada $2,500, Oregon $15,000, Washington $40,000, and Arizona $6000. Fifteen thousand dollars will be spent for surveys, $40,000 for the examination of surveys, and $10,000 held in reserve for emergency use.

IN the State Mining Bureau's large collection of minerals from all parts of the world are several specimens of gold quartz from Luzon, one of the Phillipine islands, which are declared to be from the extinct volcanic mountain of La Trinidad, where native miners work the ore by the most primitive method. They pulverize the quartz by hand in stone mortars at the mine and carry it in baskets down the mountain to a stream, where in the rudest way it is washed.

THE first of a series of bulletins to be issued by the School of Mines of the University of Wyoming on the petroleum industry of that State has been published. It gives a history of the Salt creek field and the results of field geological investigation and analysis of the oil. It is a creditable production and in line with practical work that the School of Mines of our State University might carry on without entering on the special field of operation of the State Mining Bureau.

COPPER consumption on this coast is on the increase. At present it approximates 400 tons ingot copper annually. The building of war ships and renewed activity at Mare Island has created better demand. The annual consumption of lead on this coast is probably 7000 tons. Beyond speculative probabilities the outlook for increased price in silver is not considered brilliant. Gold is in ever present demand at $20.67 per ounce 1000 fine. In the latter metal there is no competition, the supply does not exceed the demand and freight charges are at their minimum.

SYENITE differs from granite in having little or no quartz, and hence a lower percentage of silica, which varies from 45 to 65 per cent. It consists essentially of orthoclase feldspar and hornblende, pyroxene or mica, hornblende being the most common, and while dark mica (biotite) is not uncommon, the light mica (muscovite) is exceedingly rare. There is generally a greater proportion of the basic feldspars than in the granite. The term syenite was formerly used for what is now called hornblende granite. True syenite is not as abundant and as widely distributed as is granite.

PLATINUM, found in connection with gold ores in this State is not a very prominent part of California's mineral products, the yield in '95 being but 150 ounces, valued at $800. A curious method of producing platinum is reported from the Tura river in the Russian government district of Tomsk, Siberia, called "plowing the water." A raft is constructed and an inclining gutter of boards fastened to it, which at its lower end is provided with an iron plow. While floating down the river they scrape or plough its bottom. The sand scraped out falls into the gutter and passes into a tub filled with pine boughs, upon which platinum is deposited. The sand of the Tura river and its tributaries is so rich in platinum and its primitive production so profitable that the peasants are abandoning agriculture and devoting themselves to "plowing the water."

THE State Mining Bureau has just completed the field work of an investigation into the oil-producing possibilities of the State. W. L. Watts, Field Assistant to the State Mineralogist, has been engaged for a year and a half on this work. The oil districts of Santa Barbara, Ventura and Los Angeles have been surveyed and mapped by him to determine the position of the geological formations yielding the oil and to serve as a guide in further prospecting. Mr. Watts expresses the opinion as a deduction from his work that the oil-bearing formations extend from Humboldt to San Diego county following the coast range. It is anticipated that the determination of the stratigraphical position of the oil-bearing rocks made by him will assist the prospecting and development of many new districts in this extended region. The maps and data prepared by Mr. Watts will be published by the Mining Bureau in pamphlet form.

IN the last volume of this journal—the 26 numbers from January to June of this year inclusive, the mines of Amador county received thirty-eight notices varying in length from six lines to a column. Similar prominent mention was made of the mines of Butte county 27 times, Calaveras 43, Colusa, 3, Del Norte 6, El Dorado 29, Fresno 4, Humboldt 3, Inyo 12, Kern 15, Lassen 8, Los Angeles 8, Mariposa 27, Marin 3, Merced 4, Modoc 4, Mono 18, Orange 3, Nevada 38, Placer 29, Plumas 21, Riverside 16, Sacramento 8, Sonoma 4, San Bernardino 18, San Benito 4, San Diego 24, Santa Barbara 4, Shasta 31, Sierra 24, Siskiyou 32, Trinity 28, Tuolumne 28, Tulare 3, Yuba 10. Alaska mines have mention in 21 different places, Arizona 26, British Columbia 29, Colorado 39, Idaho 28, Lower California 18, Mexico 13, Montana 31, Nevada 28, New Mexico 21, Oregon 32, South Dakota 18, Washington 9, Wyoming 15, Utah 27, Australia 18, South Africa 29.

A VANCOUVER, B. C., dispatch published in the Eastern papers says: "A mining boom has fairly struck this province, fully two weeks before the time prophesied. There are scores of English and American millionaires in Kootenay and other parts of the province, while all the best mines in some districts have within the past week been bonded by English capital sent to agents here. New York and San Francisco capital is also largely represented. Hundreds of thousands of pounds of English money, drawn from South Africa and Australia, are being placed in British Columbia. The latest discovery is a 10-foot vein of gold-bearing ore near Vancouver, in the Lillooet district on the Frazer. It is free-milling ore and runs $1000 to the ton on an average, and is said to be the richest vein yet discovered in the province. A ledge has been discovered on Barclay sound, near Victoria, which is 30 feet wide. There is over a million dollars in sight." Such lies deceive nobody. Better a thousand times the conservatism of this State, that says little of its great mining wealth, than such barefaced mendacity that hurts everything and helps nothing.

THE prehistoric mine of Aramo, near Pola de Lena, in the Austrias, remains the same as in the Bronze Age, 30 centuries ago, having been surprised either by a cataclysm or by a hostile invasion. The entries consist of small vertical shafts of a mean depth of 18 feet, at the mouth of which soldiers probably kept watch to prevent the slave miners from escaping. In one place a skeleton was found bent double in the position of working, and in a fall, a little distance off, another skeleton with tools of horn and polished stone, matches, allumettes, of resinous wood the size of a pencil, and torches smeared with fat. Small tubs of wood, with the bottom consisting of a separate piece, sewn together with thongs, served to take up the ore. Throughout the whole mine no trace was found of an iron tool or of timbers; but the miners must have driven their headings with great patience and considerable muscular force. At the present time a drift is being pushed forward into the same rocks with the best drills and dynamite; but the advance is only 16 feet per month. Everywhere finger marks are found on the clay, in the cracks, which was taken out by the hand. The mine has been worked for a vertical height of 492 feet and 14,350 square yards have been worked in a large number of veins from 8 inches to 7 feet 7 inches thick, consisting of oxide of copper and cobalt. Hollow stones show that the copper was taken out in a nearly pure state; and the refuse constitutes an ore very rich in copper. A ton of refuse taken from various points in the mine yields 80 per cent of large lumps, 13.5 per cent of grains and 6.5 per cent of powder, producing on an average 15.5 per cent of copper and 1.5 per cent of cobalt, while numerous samples of the cobalt ore left in the mine show 32 per cent of cobalt.

THE financial plank adopted by the Democratic National Convention at Chicago last Thursday is as follows: "Recognizing that the money question is paramount to all others at this time, we invite attention to the fact that the Federal Constitution named silver and gold together as the money metals of the United States, and that the first coinage law passed by Congress under the Constitution made the silver dollar the monetary unit and admitted gold to free coinage at a ratio based upon the silver dollar unit. We declare that the act of 1873 demonetizing silver without the knowledge or approval of the American people has resulted in the appreciation of gold and a corresponding fall in the price of commodities produced by the people, a heavy increase in the burden of taxation and of all debts, public and private, the enrichment of the money lending class at home and abroad, the prostration of industry and impoverishing of the people. We are unalterably opposed to monometallism, which has locked fast the prosperity of an industrial people in the paralysis of hard times. Gold monometallism is a British policy, and its adoption has brought other nations into financial servitude to London. It is not only un-American, but anti-American, and it can be fastened on the United States only by the sinking of that spirit and love of liberty which proclaimed our political independence in 1776, and won it in the war of the Revolution. We demand the free and unlimited coinage of both gold and silver at the present legal ratio of 16 to 1 without waiting for the aid or consent of any other nation. We demand that the standard silver dollar shall be full legal tender equally with gold for all debts, public and private, and we favor such legislation as will prevent for the future the demonetization of any kind of legal tender money by private contract."

Status of the Miner, Past and Present.

Written for the MINING AND SCIENTIFIC PRESS by DAN DE QUILLE.

Germany was the first country in the Old World to give mining its proper place. The Germans looked upon and treated mining as a science and the miners were given a high and honorable position among the workers in the industries of the nation. The silver mines of Germany were discovered in the tenth century and have been worked ever since. Not only has the science of mining been brought to greater perfection in Germany than in any other country in Europe, but the miner there stands highe than in any other place in the Old World.

The British in the South African mines have about as good a thing in the way of cheap labor in the Kaffir as the Spaniard in America has always had in the Indian. The black man, however, is as yet rather more independent than the red one, laws not yet having been framed to place his neck in the yoke and make him work. Although he cannot be held at the mines by law, much to the regret of the big mine owners, the Kaffir is treated much the same as he would be were he a slave. He is fed on corn meal mush, like a beast of burden, and is herded and guarded in a "compound," which is a sort of modified slave-pen. The wages given him are a mere trifle, considering the hard work he is obliged to do in the deep levels of the big mines. The black men, however, with not be "expended" by the British in their mines, as the red men were by the Spaniards, unless a law can be passed which will hold him to his work as a serf if he gets in debt. The Kaffir works a certain length of time in the mines, when he quits and goes home to his corn and melon patch in spite of all that can be done at the mine to hold him. He still has notions of his own, though he will probably at no very distant day fall into the hands of the British and be worked by them as a machine for cheap production.

In India the British work the natives in the gold mines, paying them a few cents a day as wages. Both men and women are worked underground. The work of the women is harder than that done by the men. In regard to their work, John Williamson, of Deadwood, S. D., who spent six years in India as superintendent for an English company, says women are mostly worked in the shafts, where they take the place of hoisting apparatus, being cheaper than steam power. At one shaft Mr. Williamson had no fewer than 190 female workers, this force constituting two shifts. These women were stationed at a certain distance apart on a ladder in the shaft and passed the buckets containing the ore and waste from one to the other till it reached the surface. They pass the buckets very rapidly, though they are large and heavy.

The work of these women, who are obliged to stand all day on a ladder, is about as toilsome as that of the "apire" of Spanish America, who climbs the notched poles with a burro load of ore on his back. At all the mines in India this native labor, male and female, is employed when a mine is being prospected. Once a paying mine is found machinery is erected. The country, like Matabelaland, South Africa, is full of ancient mining work. Some of the old workings are many hundred feet in depth and extent. Often when cleaned out at the cost of much labor nothing of value is found in these old shafts.

In the United States, in the gold and silver mines of the Pacific Coast States, the miner stands on an equality in every respect with citizens engaged in other industrial pursuits. In no other country in the world is the working miner better situated and more independent than here and in no other country does he obtain as high wages. His home is as well and comfortably furnished as are those of other citizens of the same means; he has an abundance of good wholesome food; his family is as well dressed as those of his neighbors engaged in other industries, and his children are educated in the public schools along with the other children of the community. Indeed, instead of being looked upon as an occupation fit only for slaves and criminals, as of old, mining is being rapidly advanced to a high place among the sciences. It is to-day engaging the attention of many of the brightest minds in the country. In its various departments—mechanical, chemical, geological, metallurgical, etc.—there is room and a demand for the services of experts in at least half a dozen branches of scientific knowledge.

The industry of the miner of the precious metals is really the "father and mother" of all the other industries. It furnishes the motive power that sets in motion the wheels of all the other industries. In this country there is given the miner abundant opportunity to rise from the ranks. Men trained in our mines have been given high positions in every mining country in the world, and at princely salaries. The names of scores of Pacific coast experts in mining are famous the world over. Here mining has taken a new departure; it has been lifted out of the ruts of ignorance and slums of old superstitions and advanced to the position of a leading science. In all regions which produce the precious metals the American method of mining is being introduced and practiced. We send missionaries in the new school of mining to Mexico, South America, Australia, South Africa, India, China, Russia, Japan and many other countries where there are mines of gold and silver.

Our miners all have opportunities for acquiring handsome fortunes. Scores of our millionaires owe their wealth to mining, and many among them began as common working miners. This country is indeed the "happy hunting ground" of the miner and prospector. Among our miners of gold and silver the possibilities are great. A man who to-day cannot buy a sack of flour may be worth a million a month hence.

Our people have made the occupation of mining one that no man need be ashamed of; they have removed the stigma which attached to the industry in the Old World and raised it to a high and honorable position among the pursuits that engage the attention of civilized man.

The Old Prospector.

Written by DAN DE QUILLE.

Although many a good and kind word has been spoken of the prospector, yet full credit has seldom been given him for the important work he has performed in the way of advancing the development of the industry of mining the precious metals on the Pacific coast. Not a few look upon the prospector as a sort of shiftless, roving creature who wanders about the wilds of the mountains in a profitless way. But the fact is that the prospector occupies a very important place among the members of the mining industry. He is the pioneer and leads the way in the exploration of new mining fields, scouting out into the wilds far in advance of towns and settlements. Before mines can be opened and worked by capital they must be discovered, and it is the prospector who sallies forth and does the necessary work.

The prospector may be said to have been born in the days of "forty-nine" when the harvest of the gold of the California placers began. As soon as "born" the prospector began scouting out into the wilderness, and he has been at it ever since. "Once a prospector always a prospector." A working miner may at times do something in the way of prospecting, but the real prospector is one who is always dreaming of undiscovered veins of the precious metals in far away mountain regions and whose greatest delight is to roam and camp in new and unexplored fields. The prospector has in his composition something of the nature and disposition of the old hunter and trapper, and braves all manner of perils and endures a thousand hardships in pursuit of his favorite occupation.

In the opening up of the mining regions of the Pacific coast the prospector has everywhere been in the advance—led the way. He it was at the front who first met the arrows of the red men, battled with the wild beasts of the mountains, and encountered the dangers of waterless wastes. First the mining field is discovered, then the miners push forward and a camp is established which presently grows to be a town or city.

In Nevada, Idaho, Montana, Arizona, and almost everywhere else the prospector has been obliged to fight his way among savages, and in several sections of the Pacific coast mining regions he is still on the warpath in rugged mountain wilds. Although the prospector is always, by day and by night, dreaming of great wealth, he is seldom wealthy. He is a man of little means and when he finds a good mine he generally sells it at a price far below its real value.

The genuine prospector is not at all inclined to settle down to the hard every day toil required in the development of a mine. There is too much of the gypsy, or trapper and hunter, in his nature to permit of his permanently establishing himself in any particular spot. He has in his composition a romantic love of adventure and delights in the wild beauties of nature as he finds them in the far away fastnesses of the mountains. Besides he has dreams of wealth in many places. No sooner has he made a find and a little "raise" than he is off to explore some region of which he has long had golden visions.

Hundreds of these pioneers of mining, the prospectors, have left their bones on the deserts and in the mountains, and not a few have lost their scalps in battles with the savages. Still men are found on the trails of the mountains who are ready to brave the dangers of any region in which gold may be found from the burning sands of New Mexico to the ice-bound regions of Alaska. The true prospector always sees somewhere ahead a sort of paradise. There is a fine camping place, with plenty of wood and water, with grass for his burro in a natural meadow, and all else convenient. There, in this little miner's heaven, he places a wonderfully rich mine—a mine in which all is glittering with gold and silver. There are men who began prospecting forty years ago who are still meandering the mountain trails, though now old, wrinkled and white-haired. They are still after the big thing that is always a little way ahead.

If all do not find gold, every prospector finds more or less pleasure in his chosen pursuit, notwithstanding the hardships of the life. The prospector is generally a lover of nature and he enjoys the wilds. Reposing upon the bosom of mother earth at his campfire, he gazes into the starry heavens and takes pleasure in speculating in regard to what is in and upon the far-away twinkling and whirling worlds. He finds music in the voice of the winds in the pines and has an ear for all the night sounds of nature, the chirp of insects and the twitter of night-singing birds. Often, too, when the camp-fire has burned low, his quick ear detects the footfalls of some prowling wolf, fox, bear or other wild animal; but, with his trusty revolver under his pillow, he has no fear.

When parties of prospectors meet and camp together in the mountains, there is always a feast of golden legends. There are stories of lost leads, of rich leads that no one has ever been able to find, of float-rock filled with veins of gold and of immense nuggets picked up in various places. Every man has a story, and it is seldom a dull one. The old prospector is a man of a thousand adventures. He has had his Indian fights, his encounters with wild animals and his escapes from death by starvation and thirst; but all is at once forgotten when the word is that there is gold ahead. Then it is: "Pack the burros and away!"

The real old prospector—the man of the mountains—is a man worth knowing, and commands the respect of mining men in all the camps of the coast. As the old hunters and trappers were the avant-couriers of the westward advance of the industry of agriculture from the Atlantic seaboard to the Rocky mountains, so the prospector was the pioneer of civilization in the industry of mining. He blazed the trail to the mines; miners, machinists, merchants and men of capital then followed, and soon the wilderness was conquered.

The old prospector now sees busy towns, street cars and electric lights in a hundred places where in times past he camped and grazed his burro, and finds railroad trains rushing and roaring around mountains and through canyons, where once he painfully toiled in trackless wilds. Where he battled with the hostile savage, he now sees peaceful settlements and flourishing farms, and the laughing voices of children are heard where once the wild Indian raised his war whoop. The old prospector may have no great store of gold, but he has the satisfaction of seeing on all sides the spreading and firm rooting of the civilization for which he blazed the way.

No monument is likely to be raised to the memory of the old prospector when he crosses the dark river to the big camp on the golden shore; but in every Pacific coast State will stand to his credit the posts he planted at the front. His old camps will stand as monuments to mark his line of march and the scenes of his exploits and struggles in the wilds.

DAN DE QUILLE.

Virginia City, Nevada, July 1st, '96.

Young Sequoias.

Considering the fame of the big trees of California, it is a little surprising that ordinary tree planters in this State have not done more to distribute it more widely. Possibly they have been appalled at the ages required to make a tree like the best in our native groves in the Sierra Nevada, but probably they have passed by the plant because it is native and have given attention to foreign evergreens instead. Still there are very good sequoias here and there, but hardly more abundant here than they are in coniferous collections in the East and in Europe.

The engraving on this page shows what a group of young *sequoia gigantea* looks like, the view having been taken at the University Forestry Station near Chico. The trees at the time of photographing were about seven years old and were upwards of 17 feet high. The trees respond readily to good cultivation, for the report of the University Experiment Station, just issued, says that during the first few years after planting, the growth was slow because the ground was filled with Johnson grass roots which was cleared out when the land came under University control.

During the first summer after the cultivation began the trees grew seven feet in height, which must be considered very satisfactory and class the tree as a rapid grower. There are at the Chico station about 125 trees, of which the photograph shows but a few. The grove promises to be of great interest in the future, and records of its progress will be kept. At the Chico station there are many other interesting native and introduced trees, and the plantation will be extended and enriched as opportunity offers. Under Professor Hilgard, Mr. Charles H. Shinn has supervision of the forestry stations at Chico and Santa Monica, and he takes the keenest interest in their development.

PART OF THE YOUNG SEQUOIA GIGANTEA GROVE AT THE CHICO FORESTRY STATION.

Keeping Copper Plates Bright.

A correspondent of the *Review* writes as follows about trouble he is having with amalgamating plates in a stamp mill: "Our plates are covered with a green film, which does not apparently interfere with saving the gold. Some say it causes a loss of gold. Is it true? What is the cause of the green film and how can it be prevented?"

The greenish, or greenish gray, film forming on copper plates, often showing various colors, is due to the oxidation of copper in the amalgam; or it may be due partly to the effect of sulphates in the ore, in which case it would be at least partly a basic sulphate of copper. On good electro-silver plated copper plates we have never seen it. It certainly does cause a loss of gold in amalgamation. When it appears the stamps should be hung up and the coppers cleaned. This may be done with ammonia, a solution of caustic soda or potash, or a dilute solution of cyanide of potassium. After removal a little more quicksilver should be rubbed in. If it then appears it should be removed as before, all the amalgam scraped off and a good coating of silver amalgam rubbed in. Silver amalgam will prevent its reappearance.

If pure silver can be obtained it can be easily made by using about three parts of quicksilver to one of silver. It requires about one-fourth ounce of amalgam to each square foot of surface to be amalgamated. If pure silver cannot be obtained, a good way to make it is to use silver dollars. Dissolve them in a porcelain evaporating dish, or any chinaware dish if such be not at hand, in dilute nitric acid, and evaporate it to dryness, over hot water, or a water bath. Heat the dry mass gently till it fuses, and all the bluish tinge is changed to grayish black. When this point is reached the copper alloy in the silver coin will be changed to an insoluble oxide. Then dissolve all that will dissolve in a very little water, and filter into a glass jar. To this add the quicksilver required, and drop in a few bright nails or other iron. The

silver will be deposited as metallic silver and form amalgam with the quick, and in two or three days it will be complete and ready to use without other care.

It is a good idea to always use silver amalgam on the plates, rather than pure quicksilver, because it keeps the surface cleaner, and we believe, causes a better saving of the gold.

Knots and Splices in Manila Rope.

Some recent inquiries about the details of knots and splicing in ropes led to the belief that an illustrated article on that subject would be of practical interest. The best information on the subject that has recently come under our observation is contained in a pamphlet issued by the C. W. Hunt Co., 45 Broadway, N. Y., to whose courtesy we are indebted for the illustrations on the front page of this issue and much of the description.

To properly splice a rope or to tie a knot that will not slip, is quite an acquisition. The splice in a transmission rope is not only the weakest part of the rope but is the first to fail when the rope is worn out. If the splice is not strong the rope will fail by breakage or pulling out of the splice. If the rope is larger at the splice, the projecting parts will wear on the pulleys and the rope fail from the cutting off of the strands.

To profit by the experience of others, do not put in a "short splice" or an ordinary "long splice," or get an "old sailor" to do the work, but have some handy man follow the directions given herewith for a splice in a 4-strand rope.

Figures 1327, 1328, 1341 and 1342, on the front page of this issue, show each successive operation in splicing a 1¾ inch manila rope. Each engraving was made from a full size specimen and accurately shows the position of the parts. Tie a piece of twine 9 and 10, around the rope to be spliced about six feet from each end. Then unlay the strands of each end back to the twine. Butt the ropes together and twist each corresponding pair of strands loosely, to keep them from being tangled, as shown in engraving No. 1327.

The twine 10 is now cut, and the strand 8 unlaid and strand 7 carefully laid in its place for a distance of 4½ feet from the junction. The strand 6 is next unlaid about 1½ feet and strand 5 laid in its place. The ends of the cores are now cut off so they just meet. Unlay strand 1 four and a half feet, laying strand 2 in its place. Unlay strand 3 one and a half feet, laying in strand 4. Cut all the strands off to a length of about 20 inches, for convenience in manipulation.

The rope now assumes the form shown in Fig. 1328, with the meeting points of the strands 3 feet apart. Each pair of strands is successively subjected to the following operation: From the point of meeting of the strands 8 and 7, unlay each one three turns; split both the strand 8 and the strand 7 in halves as far back as they are now unlaid and the end of each half-strand "whipped" with a small piece of twine.

The half of the strand 7 is now laid in three turns and the half of 8 also laid in three turns. The half strands now meet and are tied in a simple knot, 11 (engraving No. 1341) making the rope at this point its original size. The rope is now opened with a marlin spike and the half-strand of 7 worked around the half-strand of 8 by passing the end of the half-strand 7 through the rope, as shown in the engraving, drawn taut and again worked around this half-strand until it reaches the half-strand 13 that was not laid in. This half-strand 13 is now split, and the half-strand 7 drawn through the opening thus made and then tucked under the two adjacent strands, as shown in cut No. 1342. The other half of the strand 8 is now wound around the other half-strand 7 in the same manner. After each pair of strands has been treated in this manner, the ends are cut off at 12, leaving them about 4 inches long. After a few days' wear, they will draw into the body of the rope or wear off, so that the locality of the splice can scarcely be detected.

The stretch of a transmission rope during its life is no greater in amount than that of a leather belt, yet it is a material amount, and when several ropes run side by side on a pair of pulleys, the different ropes are likely to wear unevenly, and some sag more than others—so much so, in some cases, as to materially increase, not only the wear of the ropes themselves, but to increase the friction loss in the transmission. The gradual lengthening of the rope in service may decrease the tension until the rope slips on the pulley, making it necessary either to resplice the rope or to use a take-up sheave with a long range of motion.

This difficulty, however, can be completely obviated by the use of the rope coupling shown in cut No. 95,130. This coupling is smaller than the rope, so that it does not touch the pulleys. It is made in two parts, which are secured together when the rope is put on the pulleys, containing an inside ratchet, by which the two parts can be rotated and locked in any desired position. When the rope has stretched any perceptible amount, the two parts of the coupling are turned in opposite directions, putting more "turns" in the rope, thus shortening it any desired amount. In this manner all the ropes of a multiple drive can be kept at the same tension with the greatest exactness.

A great number of knots have been devised of which a few only are illustrated, but those selected are the most frequently used. In the engravings they are shown open, or before being drawn taut, in order to show the position of the parts. The names usually given to them are: A, Bight of a rope; B, Simple or overhand knot; C, Figure 8 knot; D, Double knot; E, Boat knot; F, Bowline, first step; G, Bowline, second step; H, Bowline completed; I, Square of reef knot; J, Sheet bend or weaver's knot; K, Sheet bend with a toggle; L, Carrick bend; M, Stevedore knot completed; N, Stevedore knot commenced; O, Half-hitch; P, Timber-hitch; Q, Clove-hitch; R, Rolling-hitch; S, Timber-hitch and half-hitch; T, Slip knot; U, Flemish loop; V, Chain knot with toggle; W, Blackwall-hitch; X, Fishermen's bend; Y, Round turn and half-hitch; Z, Wall knot commenced; AA, Wall knot completed; BB, Wall knot crown commenced; CC, Wall knot crown completed.

The principle of a knot is that no two parts, which would move in the same direction if the rope were to slip, should lay alongside of and touching each other.

The bowline is one of the most useful knots; it will not slip, and after being strained is easily untied. It should be tied with facility by everyone who handles rope. Commence by making a bight in the rope, then put the end through the bight and under the standing part as shown in G, then pass the end again through the bight, and haul tight.

The square or reef knot must not be mistaken for a "granny" knot that slips under a strain. Knots H, K and M are easily untied after being under strain. The knot M is useful when the rope passes through an eye and is held by the knot, as it will not slip and is easily untied after being strained.

The timber-hitch, S, looks as though it would give way, but it will not; the greater the strain the tighter it will hold. The wall knot looks complicated, but is easily made by proceeding as follows: Form a bight with strand 1 and pass the strand 2 around the end of it, and the strand 3 around the end of 2 and then through the bight of 1 as shown in the engraving Z. Haul the ends taut when the appearance is as shown in the engraving AA. The end of the strand 1 is now laid over the center of the knot, strand 2 laid over 1 and 3 over 2, when the end of 3 is passed through the bight of 1 as shown in the engraving BB. Haul all the strands taut as shown in the engraving CC.

The treatise referred to on ropes used for the transmission of power contains formulæ, tables and data useful in engineering, and is of practical value. Those interested in the matter would do well to send for the pamphlet to the above address.

Electrical Progress.

Electricity Direct From Coal.

In the July number of the *Engineering Magazine*, discussing the direct production of electricity from coal, and Dr. Jacques' promise of a revolution in power production, G. H. Stockbridge says Dr. Jacques began his investigations some five or six years ago, and in 1891 he prosecuted a series of experiments which demonstrated the practicability of his electric furnace. By Dr. Jacques' own account, his invention is based on the discovery "that, if oxygen, whether pure or diluted, as in air, be caused to combine with carbon or carbonaceous materials, not directly, as in the case of combustion, but through an intervening electrolyte, the potential energy of the carbon may be converted directly into electrical energy, instead of into heat." Practically, Dr. Jacques supplies the active or oxidizing element of his generating cell with an excess of oxygen by means of an artificial air-blast. The electrolyte, whose first action after the cell is set up is to release its oxygen and so permit it to attack the carbon, is thus continuously renewed by fresh charges of oxygen, which are at once carried to the carbon for a continued attack. The carbon is consumed, and electrical energy is developed in a corresponding degree, the rate of consumption and the strength of the electric current being gauged by the rapidity with which air is supplied to the electrolytic compound.

The generating apparatus consists of a pot of pure iron surrounded by a suitable furnace containing caustic soda (sodium hydrate), into which extends a rod or cylinder of carbon. Naturally the carbon must be in such a state that it may serve as a good electrical conductor. Gas carbon and charcoal are available without special treatment, but anthracite coal has to be baked to give it the requisite conductivity, and bituminous coal needs, for the same purpose, to have some of its hydrocarbons driven off. Commercial caustic soda can be used without expelling the usual impurities.

In addition to the foregoing elements of the generator, Jacques provides an air-pump for forcing into the sodium hydrate an excess of oxygen, the air containing the oxygen being carried to a "rose" for distributing the air currents through the electrolyte in fine sprays. The rose is made of a metal not acted upon by the hydrate. The whole being supplied with a suitable insulating cover having a proper vent, the apparatus can be set in operation by bringing the furnace and its inclosed generator and electrolyte to a temperature of 400° to 500° Centrigrade, and operating the air pump. By virtue of the violent ebullition caused by the jets of air, every part of the electrolyte is brought into contact with the air, from which it takes up oxygen in excess; after which it is carried against the carbon and releases the oxygen collected in its travels. The carbon is attacked by the oxygen and suffers a gradual consumption as long as the operation continues.

It is found that the electrolyte needs renewing at intervals, by reason of its slow contamination by carbonate of soda, resulting from the union of some of the caustic soda with carbonic acid developed in the generating process or coming from the injected air. Moreover, the ash from the carbon tends to lessen the efficiency of the electrolyte. But, if a small percentage of oxide of magnesium be added to the electrolyte, its renewal may be sensibly postponed. According to Dr. Jacques, the oxide of magnesium serves as a carrier to convey the carbonic acid through the electrolyte. His conception of the action of the oxide of magnesium is that free carbonic acid combines with it in preference to the caustic soda, and that the carbonate of magnesium so formed is quickly decomposed into carbonic acid, which escapes, and oxide of magnesium, which is again ready to repeat its action. In any case, that part of the carbonic acid which causes contamination is very small, the most of it bubbling up through the caustic soda and escaping into air.

Respecting the oxidizing agent, Dr. Jacques says: "There are many electrolytes that may be used in practising my invention. Following are some of the desirable characteristics: They should become liquid at a convenient temperature. They should possess good electrolytic conductivity. They should be capable of readily taking up oxygen from the air or other source of supply, and also capable of readily giving up oxygen into combination with the carbon. They should not have a strong affinity for carbonic acid, and, in case air is used as a source of oxygen supply, should not have any considerable affinity for the nitrogen or other substances with which the oxygen of the air is diluted. The molten hydrates of potash and soda are especially suitable for practical use." The use of pure iron for the collecting electrode is recommended as generally applicable and inexpensive; but steel and iron containing a considerable amount of carbon are to be avoided. The sodium hydrate, when melted, has no sensible chemical action upon the iron, which, therefore, remains substantially unchanged.

Briefly, the process employed by Jacques consists in chemically combining oxygen with carbon by impregnating a molten basic electrolyte, which is in contact with the carbon, with oxygen or air, and collecting the electricity thereby developed by means of an electrode not acted on by the impregnated electrolyte when the circuit is completed. To render the process continuous, a sufficient heat is maintained by means of a suitable furnace, and the air-pump is kept in operation. Incidentally, the bubbling of the air through the heated electrolytic compound contributes to securing and preserving a uniformly distributed heat, which is, of course, to be desired.

Uses of Electricity in Metallurgy.

Before smelting, many ores have to be submitted to processes of preparation, and it is found that even in these preliminary operations electricity is of service. The magnetic and non-magnetic portions of a mixture can be separated by electro-magnetic contrivances, of which 270 have already been patented in the United States. Electro-magnetic preparation has been applied chiefly to ores of iron, lead and zinc. We first come to those under the head of reduction of oxides by heat; in these cases, however, electricity is only employed as a means of producing a high temperature. But it is important to notice that all oxides (naturally with the exception of carbon monoxide) can be reduced by this method in presence of carbon. The Cowles process of manufacturing aluminum bronze was the first important application of this principle. The *Iron World* shows that chromium, manganese and tungsten can be produced in the same way, although chromium and tungsten have a very high melting point. In the chemical decomposition of sulphides and salts, electrical methods have found no applications; but after this we come to processes which are entirely electrical. It will suffice to point out that the only metals not included in the columns for electrolysis of aqueous solutions and fused compounds are iron, mercury and tungsten. Even these can be prepared electrolytically, but as yet the electrical methods have not been able to compete with the others. Among present applications of electrolysis may be mentioned the refining of metals and the manufacture of metallic objects (Elmore, Klein), the reduction of aluminum, the separation of gold and silver, the extraction of gold by the cyanide process and electrolysis, electro-deposition of zinc, etc. Hitherto electricity has played but a small part in the great iron industry, but strenuous efforts are being made

to apply it both in the preparation of the raw material and in the subsequent processes of manufacture.

R. P. WILLIAMS describes a process originated by A. B. Brown for the electrolytic production of white lead. It consists in decomposing, by an electric current, a solution of sodium nitrate containing about one pound to the gallon, in wood cells provided with porous diaphragms; the nitric acid radical attacks the positive electrode, which is of metallic lead, and the lead nitrate solution thus formed is precipitated later by the sodium hydrate produced at the other electrode. The precipitated lead hydroxide is digested with bicarbonate of soda solution, whereby lead carbonate in a very fine state of division is obtained. The sodium nitrate is thereby regenerated. The sodium bicarbonate used is formed by passing carbon dioxide into the caustic soda solution. It is claimed that the process can be made a commercial success, the white lead being equal or superior to that made by the old "Dutch process." The plant required is small for a considerable output, and there is no loss of time, the reactions taking place rapidly. There is a great saving in labor and materials. The product of the electrolytic process is in a very fine state of division, and is claimed to be of a spongy character, non-crystalline, and having great covering power.

Scientific Progress.

Mysteries in Science.

What we do know is so little in comparison with that which baffles us, that the pride of man is humbled when he contemplates the fact. Here before us is a white pine tree in which the leading shoot that forms the trunk ultimately goes so straight upwardly that a plumb line can show no deviation from the perpendicular, while the lateral branches push out at a right angle with the stem. The power which directs these different directions is wholly unknown, and then note how this direction varies in different trees. While the leader in a Norway spruce is directed as truly perpendicular as the white pine, the lateral branches are at an acute angle—and the angle of nearly the same degree in all the individuals of the species. If we then compare the angular divergence with other species, we find that most have a plan of their own, which is followed through all the individuals of the species,—nearly all, for "never" is a word unknown to nature.

Of the atmosphere around us we know scarcely nothing. In other eyes than ours it would look like a huge aquarium in which myriads of forms of plants and animals are floating, while man would look like a little streak of black sand strewn along the bottom. Even the elements of which this atmospheric sea is composed are in a measure unknown, judging by discoveries continually made. We had thought we knew, and that oxygen, hydrogen, nitrogen and carbonic acid gases alone constructed it—but now we have found another, which has been named argon. Once we had concluded that hydrogen was the mother of all the other gases. It looks as if argon was, in the new light, but then even argon may have to go.—Thomas Meehan.

Mountain Ranges.

The origin of what is termed the "American theory" of the formation of mountain ranges is largely due to Prof. le Conte of Berkeley, at the State University. It is known as the contraction theory, which assumes that the earth was once an incandescent ball, now cooling, a coolness which compels yielding along its lines of weakness. An interesting investigation of the phenomenon of mountains has led to the opinion that they are born of sea margin deposits, observation showing that existing off-shore deposits are coarse at the top shading down to that which is fine by the same law as that marked in the structure of mountains, but the enormous mountainous deposits would, it is argued, have been possible only where there was a corresponding subsidence of sea bottom.

That the earth sinks by loading and rises by unloading is illustrated by the Colorado plateau. Originally 20,000 feet high, 12,000 feet have been removed by erosion, which has caused the remaining 8,000 feet to rise above the general level. It is claimed to be proved that the cosmic behavior of the earth is that of a rigid solid—that as a solid globe of glass 6 feet in diameter will change shape by the pressure of its own weight the earth does the same. The earth, however, not being homogeneous, accounts for its radical contraction being in ridges.

IN several industrial pursuits in which metal and glass are ground on a wheel, and the air about the workman is filled with dust, health is often impaired and life is shortened by inhaling these irritating particles. Among the various devices proposed and tried for meeting this evil is a mask, to be worn over the workman's face and provided with a sort of strainer, through which all air must pass on the way to his lungs. Recently a prize was awarded by the French "Society for the Prevention of Accidents in Industrial Pursuits" for the best form of respirator produced to Dr. Detourbe, whose design has now been adopted in a number of workshops in northern France. The mask is so shaped as to fit the lower half of the face closely, but not to interfere with the wearer's vision. A chamber in the middle, through which the air is filtered and which projects only a slight distance from the rest of the mask, contains a layer of asbestos and also one of cotton or wool, arranged between small plates of aluminum gauze. The mask is of copper, and a strip of elastic felt runs around its inner surface near the edge, thus insuring a good contact all around. The device is held on with light elastic bands encircling the head, one on a level with the forehead and the other about opposite the lower lip. The orifice is so large, and the lining of the chamber so loosely packed, that the wearer can breathe and can talk without difficulty.

C. W. HERSHEL, a Nova Scotia whaler, says he is going to place a dynamo on his ship. "On board I will have a big reel of heavily insulated wire. The reel will be placed in the smaller boat, in which we go out to meet the whale. We shall have several thousand feet of wire on the reel. One end will be connected with the dynamo. At the other end, which will be in the smaller boat, will be a hard rubber stick, about four feet in length. The wire will run through that stick so that it may be handled easily and safely. At the end of the stick will be attached a piece of metal 24 inches long and one inch in diameter. The point of the needle will be sharp, so as to penetrate the flesh of the whale easily. The hard rubber stick and the big needle will be used just as we use the harpoon to-day. When near the big fish, as near as we get in the old way, the harpooner will throw the electric barb. At the time there will be a current of 10,000 volts running through the wire. When the point of the needle strikes the whale a current connection will be formed with the dynamo, and the whale will get the full shock of the high voltage and be dead in the fraction of a second." It sounds all right, but he may have difficulty in the continuity of the current.

THE new highway is a gutter steel track one-fourth of an inch thick, five inches wide, flat on the bottom, with sides half an inch high, then extending outward 1½ inches, then down 1½ inches. It is spiked to a longitudinal timber laid on cross ties. No spike heads are on the surface, and the track is perfectly smooth. The track is laid 4 feet 8½ inches from center to center—the standard gauge of all wagons and railroad cars." The middle and sides are filled in with stone—in fact, is a macadamized road with steel tracks for the wagon wheels. On this steel track one horse will draw 20 times as much as on a dirt road. Freight can be hauled on a steel track road for less than half average charge on lateral roads. This means an economic revolution. The practice of all trunk lines, in the language of one of the highest railroad officials in the nation, is to charge "all that the traffic will bear," to meet the fierce competition of rival routes to the seaboard, and the freight along lateral roads is charged enough more to make on the whole a satisfactory profit. This robbery by the trunk lines, who control all lateral feeders, has been carried to such lengths that freight to and from distances of 1,000 miles is carried to and from market at less per ton than is charged on lateral roads for 100 miles.

Mechanical Progress.

Air Hoist Table.

Herewith is prepared a table of the lifting capacities of direct acting air hoists, with volume of free air per lift, and cost of air per single lift and 100 lifts, with a maximum lift of 4 feet, and a minimum pressure of 90 lbs air furnished at 5 cents per 1000 cubic feet of free air:

Diameter of cylinder.....	Effective area of piston.....	Maximum weight lifted.....	Cu. ft. free air for 4 ft. of lift.	Cost of air per lift.....	Cost of air per 100 lifts.....
2	3.05	274	.74	$0.000037	$0.0037
3	6.87	619	1.67	.000094	.0084
4	12.22	1,099	2.97	.000149	.0149
5	19.09	1,718	4.64	.000232	.0232
6	27.49	2,474	6.68	.000334	.0334
7	37.42	3,367	9.09	.000455	.0455
8	48.87	4,398	11.88	.000594	.0594
9	61.85	5,566	15.03	.000752	.0752
10	76.36	6,872	18.56	.000928	.0928
11	92.39	8,315	22.46	.001123	.1123
12	109.96	9,896	26.73	.001337	.1337

Air used in combination with a low pressure hydraulic system gives the best results for heavy loads. By interposing the water between the elastic medium air and the load we eliminate that element of danger which otherwise would be present in handling vessels of molten metal, as in foundry practice, and also obtain a sort of elastic positiveness which is so essential and desirable. In the actual work of molding, as in lifting copes and molds, drawing patterns and moving cores, the men are enabled to do about 50 per cent more work and do it easier and better when equipped with a hydro-pneumatic hoist. Included in this percentage is the saving in repairs and the danger of losing castings. These hoists more nearly approach the old-fashioned hemp rope cranes in their elasticity as the compressed air behind the water seems to impart this peculiar quality.

THE Boston & Montana Consolidated Copper and Silver Mining Company, Great Falls, Mont., is installing about as large and powerful a pair of horizontal turbines, under the head they will operate, as have ever been turned out in this country. The turbines are 57 inches diameter, and, under the average head they will work, will develop 3258 H. P. They are placed on a cast-iron draft chest and discharge centrally through a draft tube; are surrounded by an iron flume 14 feet 6 inches in diameter and 32 feet 6 inches long. The whole is mounted on double I-beams on each side 20 inches deep, 28 feet long, with four cross I-beams. The iron shaft is 10 inches in diameter, 42 feet 2 inches long, weighing five tons. There are stands outside of the flume at each end which support the shaft. Each of these stands weighs 8000 pounds, on which is placed babbitt-lined journal boxes, in which the shaft revolves. The two turbines and outfits complete weigh 250,000 pounds. These operate two electric generators, one coupled directly to each end of the shaft, which will run 144 to 160 revolutions per minute, and will be used for smelting. The varying revolutions are required in order to increase or diminish the blast as conditions may require.

Fly-Wheel Calculations.

It is frequently desirable to ascertain whether a certain fly-wheel is heavy enough for its work. A practicable off-hand method of ascertaining this point is to divide the constant 5,000,000 or 6,000,000, according to the speed of the wheel, by its diameter; that is, if a wheel is running very fast, use the constant 5,000,000; if it is running slow, use the constant 6,000,000. After dividing by diameter of the wheel, divide it again by the square of the number of revolutions per minute. The quotient will be the number of pounds weight of rim required in each horse-power, and from these data the size of the wheel necessary can be readily calculated.—Tradesman.

Blasting Under Water,

In some blasting operations for removing submarine rocks lately carried out at Emmerich, on the Rhine, black powder was employed in water-tight cases, fired by safety fuse. The great difficulty occurred in tamping the shots under water; but this was at length successfully accomplished by running into the hole over the charge, by means of a funnel, quick-setting cement in a liquid state. The tamping, from 1½ to 2 meters long, was effected by means of tubular drifts, like gas pipes, toothed on their lower edge.—American Manufacturer.

THE British torpedo destroyer, H. M. S. Desperate, on a recent trial trip with the standard load on board, showed a mean speed of 30.46 knots, or 35 miles an hour, with 5600 horse-power, 210 pounds pressure, 24 inches vacuum, 406 revolutions. The Lucania would make 50 of her, but she has one-sixth of the Lucania's power, although with 50 per cent more speed. She would cross the Atlantic in a little over four days. She is 210 feet over all, with a beam of 19 feet 6 inches, and a depth of 13 feet 6 inches. The government of Great Britian has ordered 42 vessels of the kind.

A new method of preparing alloys was recently described in an interesting paper, read at the Academie des Sciences by M. Moissan. M. Moissan obtains alloys of refractory metals by projecting a mixture of the oxide with powdered aluminum into a bath of liquid aluminum. It is found that the heat set free by the oxidation of the aluminum is sufficient to carry on the reaction. In this manner alloys of aluminum with nickel, molybdenum, tungsten, uranium, and tinanium have been obtained.—Industries and Iron.

AN excellent property of aluminum is its sonorousness. Accordingly to Faraday's experiments the sound of an aluminum bar is not limited to a single tone, with its corresponding upper tones, but there are two different tones audible, one in the longitudinal and one in the transverse direction. This may be easily observed by hanging a bar on a thread and holding it near the ear whilst striking it.—Electricity.

To distinguish between iron and steel tools, quickly place the tool upon a stone and drop upon it some diluted nitric acid (four parts of water to one of acid). If the tool remains clear, it is of iron; if of steel, it will show a black spot where touched with the acid. These spots can be easily rubbed off.

THE metals now known to be capable of combining with argon at a red heat include magnesium, lithium, barium, aluminum, zinc, iron and copper. Barium rapidly absorbs nitrogen, and its use has been suggested as a ready means of separating argon from air.

Practical Information.

Nervous Strain of Railway Work.

There is reason to believe, says the *Medical Journal*, that at all times there are men on the line who are working very near to their breaking strain. We may in regard to this mention three well-known instances which, at the least, show the tension under which work is often carried on. A station master, seeing a man run over on the line, himself fell down dead upon the platform. Here was a shock which permanently made his heart stand still; but how many times had not that man's heart stood still before? We may feel perfectly certain that if the major shock could kill, the minor daily recurring shocks of a railway life must have greatly damaged a heart so under the influence of the nervous system. Two trains collided at a junction. It was either the fault of the drivers or of the rails, certainly not of the signal man. The signals were not right; yet when the box was entered the signal man was found to have gone mad, and had to be taken to the asylum, where he remained for long. He was broken utterly by the horror of the dilemma; but what shall we say about the smaller dilemmas which every hour of his working life he had had to solve? Did they not also have an effect, although a lesser one, upon his brain? A few years ago it was found that the sickness rate among the signal men of certain lines was becoming excessive, and it was determined to do away with the system of leaving to one man the whole responsibility of taking charge of a signal box. At great expense every box along the line was supplied with two men. Great evils were prophesied; it was thought the men would talk and lark and neglect their duties. This did not happen, but the sickness stopped. Under the shared responsibility they no longer broke down. If, then, as seems to be indubitable, railway "strain" can have definitely injurious effects upon the nervous system, it becomes an important question for inquiry whether this nervous derangement at all frequently has the effect of impairing the nutrition of heart.

Why Stone Walls are Damp.

The walls of a stone house and sometimes of a brick house, are covered with dampness. This is due to the very same causes by which dew is deposited on grasses or moisture on the side of a glass or pitcher that is filled with ice water and brought into a warm room. The walls become cold, and as stone is a nonconductor of heat, they remain cold for a long time. When the weather changes suddenly from cold to warm, the air becomes filled with moisture, for the warmer the air is the more moisture it will absorb. When this warm air strikes the cold walls the moisture is deposited on it from the air, which is suddenly cooled by contact with them, and as the warm air is continually coming in contact with the cold walls, the dampness accumulates until it appears like dew upon them, and pours down in streams at times. It is easily prevented. No plaster should be put directly upon brick or stone but furring strips should be nailed to the wall and the laths put on these. Cellars are frequently made very damp in the same way by too much ventilation in warm weather.

A MEDICAL AUTHORITY says celery is a cure for rheumatism, and asserts that the disease is impossible if the vegetable be cooked and freely eaten. The fact that it is almost always put on the table raw prevents its therapeutic powers from becoming known. The celery should be cut into bits, boiled in water until soft, and the water drunk by the patient. Put new milk, with a little flour and nutmeg, into a saucepan with the boiled celery, serve it warm with pieces of toast, eat it with potatoes, and the painful ailment will soon yield. Such is the declaration of a physician who claims to have tried the experiment with uniform success. He adds that cold or damp never produces, but simply develops, the disease, of which acid blood is the primary and sustaining cause, and that while the blood is alkaline there can be neither rheumatism or gout. English statistics show that in one year (1876) 3640 persons died of rheumatism, and every case, it is claimed, might have been cured or prevented by the adoption of the remedy mentioned. At least two-thirds of the cases named heart disease are ascribed to rheumatism and its agonizing ally, gout.

IN every commercial transaction involving any semblance to a contract, it is always best to have a definite understanding between the parties, and, if possible, that understanding should be in black and white. He who borrows even $5 should insist on giving a note therefor, and the lender ought not to refuse it. As far as possible, payments should be made in bank checks, and receipts invariably given and required. In extending credit it is especially necessary that a day of settlement should be fixed, and that the debtor, as well as his creditor, should understand that the designated day is to be a day of settlement. No one should enter the employ of another, nor should anyone receive service, until the question of remuneration has been definitely decided. In business it does not do to take things for granted. People are very likely to form different ideas of the meaning of a verbal agreement, and any man's memory is treacherous at times. If men would only insist upon understanding the contracts between them as they were made, there would be no necessity of appealing to the law for an interpretation. No one knows how much litigation, and loss, and disbonesty, and trouble, would be obviated if business people strictly adhered to the rule of undertaking no obligation without first arriving at a mutual conclusion as to the exact limits of that obligation.

ONE feels chilly when lying down because nature takes that time to give the heart rest, and that organ consequently makes ten strokes less a minute than when one is in an upright posture. Multiply that by sixty minutes, and it is six hundred strokes. Therefore in eight hours spent in lying down the heart is saved nearly five thousand strokes, and as the heart pumps six ounces of blood with each stroke it lifts thirty thousand ounces less of blood in a night of eight hours spent in bed than when one is in an upright position. As the blood flows so much more slowly through the veins when one is lying down, one must supply then with extra coverings the warmth usually furnished by circulation.—Harper's Bazar.

THE cracking of rubber goods is believed to be caused by the oxidation of the caoutchin, the essential oil of caoutchouc. Vulcanization does not lessen the affinity of this substance for oxygen. The compounds used tend to fill the pores of the rubber and thus somewhat reduce the opportunity for oxidation, but the metallic oxide and other substances introduced in vulcanization and dyeing—including sulphuric acid from antimony sulphide—are often injurious and boiling in caustic soda to remove the "bloom" left on goods by an excess of sulphur may cause injury. A comparison of analyses of the damaged rubber with those of the sound shows very large increase in the percentage of oxygen and some loss of carbon and sulphur.

"A STRIKING ILLUSTRATION of the influence of fatigue upon the nervous system," says *Modern Medicine*, "is afforded by an experiment conducted by an Italian physician some months ago. Twenty-four bicycle riders, who had ridden 32 miles in two hours and a quarter were examined with reference to their hearing, and it was in nearly every instance found to be defective. After two hours' rest the hearing had become normal in most of them."

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

SANTA CRUZ COUNTY—Continued.

NAME OF MINE.	Character of Mine.....	No. of Men Employed.	Location.	Name of Superintendent or Agent.	Address.
Chittenden Gas Sp'ng	Crude petrol.	.....	½ m N of Chittenden Sta.	Mrs. T. Chittenden, Owner.	.....Chittenden
Chittenden Springs..	Miner'l water.	.....	Near Chittenden Station.	Mrs. T. Chittenden, O'n	.....Chittenden
Chalmers Arte'n Well	Water.	....	Near Watsonville.....	Mrs. P. Chalmers, Own	..... Watsonville
De Dero Quarry.....	Mac-adam.	.....	1¼ m NW of Santa Cruz.	W. E. Miller, Supt.	..... Santa Cruz
Enright Quarry. ...	Bitu'm rock.	63	11 m NW of Santa Cruz .	J. D. Enright, Own...	..... Santa Cruz
Granite Rock Co.....	Mac-adam.	14	1 m W of Chittenden Sta.	H. S. Fletcher, Supt.	..... Watsonville
Holmes, W. T., Lime Co	Lime.	4	1½ m W of Felton.....	Wm. Russell, Supt...	..... Felton
IXL Lime Quarry ...	"	18to20	1¼ m NW of Felton.....	B. Cerf, Supt.	..... Felton
Mitchell Arte'n Well	Water.	.....	Watsonville.....	T. Mitchell, Own.....	..... Watsonville

SAN BENITO COUNTY.

Bitter Water Quarry.	Gyp-sum.	.....	12 m N E of Kings City..	S. Lyons, J. F. and P. J. Dunne.	.....Kings City
Breen's Arte'n Wells.	Water.	.....	1 m N E of San Juan....	Patrick Breen	.....San Juan
Chalone	Gold.	.....	35 m S E of Hollister....	Thos. Flint, Jr.....	.....
Cienega Works.....	Lime.	18	13 m S of Tres Pinos.....	F. A. Enos.....	..... Paicines
Culp's Wells.....	Water.	.....	7 m N of Hollister	J. D. Culp.	.....San Felipe
Chase's Wells.....	"	.....	6 m N of Hollister.....	Nute Chase.....	.....Hollister
Gypsy.....	Cinna-bar.	.....	16 m N E of Hollister....	Frank Wixam.....	.....Chicago
Hollister Irrig'n Canal	Water.	3 to 6	Near Hollister.....	B. F. Gould, Supt.....	.....Hollister
Hollister Water Co.'s Wells.....	"	.....	Near Hollister.....	J. W. Hawkins, Pres.	.....Hollister
McMahan's Wells....	"	.....	2 m N of Hollister.....	B. McMahan.....	.....Hollister
New Idria.....	Quick-silver.	.....	58 m S of Los Pinos.....	E. G. Holmes, Supt.	.....New Idria
Spitt's Artesian Well	Water.	.....	1 m W of San Juan.....	Frank E. Spitt.....	.....San Juan
San Benito.....	Coal.	.....	45 m S E of Hollister....	G. Nash	.....Hollister
San Justo.	Gold.	.....	7 m W of Hollister. ...	Thos. Flint, Jr	.....Hollister
Watson's Arte'n Well	Water.	.....	Hollister.....	D. J. Watson, Owner.	.....Hollister

SANTA BARBARA COUNTY.

Anna Moore.....	Gold.	4	30 m NW of Santa Barbara	W. J. Reseigh.....	.....Santa Ynez
Abernethy	"	4	3 m N of Point Sal.....	H. Marsh.	.....Guadalupe
Burton Mound Sp'ngs	.....	.....	Santa Barbara.....	Eli Kimberly, Supt....	...Santa Barbara
Campodonico Artes'n.	Water.	.....	Guadalupe.....	S Campodonico, Owner	.....
Erickson Quarry.....	.....	.....	8 m SW of Santa Maria..	J. B. Erellanas.....	... Santa Barbara
Holt Bros.' Well.....	Water.	.....	1 m S of Guadalupe.	Holt Bros.....	.....Guadalupe
Johnson's Arte'n Well	"	.....	3 m W of Guadalupe. ...	H. H. Johnson.....	..... " Guadalupe
La Patera.....	Bitu-men.	23	10 m W of Santa Barbara	Alcatraz Asphalt Co.; Richard Eden, Supt.	..... Goleta
Moore.....	Asph't	5	7 m W of Santa Barbara.	David Culver.....	..... Goleta
Pacific Asphalt Co...	"	30	13 m S E of Santa Maria.	A. N. Hillspaugh.	.....Santa Maria
Saulsburg's Well.....	Water.	.....	1¼ m W of Guadalupe....	T. Saulsburg	.....Guadalupe
Santa Maria.....	Asph't	3	10 m SE of Santa Barbara	Santa Maria Asph. Co.	.....Santa Maria
Sisgol.....	Oil prosp't	.....	22 m SE of Santa Barbara	J. B. Treadwell.....	..... Oakland
Santa Barbara Hot Springs.....	Sulph'r	.....	6½ m NE of Santa Barbara	J. A. Kimberly, Supt.	...Santa Barbara
Santa Barbara Arte'n	Water.	.....	Santa Barbara.....	City of Santa Barbara, Own.	...Santa Barbara
Veronica Springs....	.....	.....	3 m W of Santa Barbara.	W. A. Hawley, Supt..	...Santa Barbara

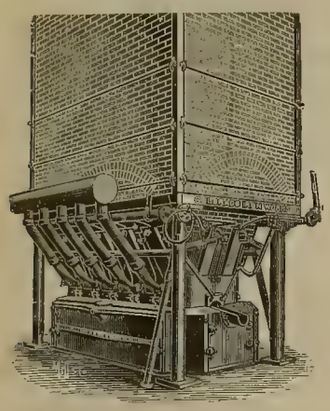
SANTA CLARA COUNTY.

Azull Springs.	Miner'l water.	.....	12 m S W of San Jose.....	H. C. Fister, Supt....	.....San Jose
Almaden Springs.....	Vichy water.	.....	At Hacienda.....	H. C. Fister, Supt....	.....San Jose
Alum Rock Springs..	Miner'l water.	.....	7 m N E of San Jose.....	H. B. Alvord, Secy...	.....San Jose
Cochran Quarry.....	Mag-nesite.	.....	4 m E of Madrone Station	Mrs. A. F. Cochran, Owner; Leased by Pac. Rolling Mills,	.....S. F.
Citizens' Water Co...	.....	.....	Coyote	E. G. Wheeler, Supt..	..... San Jose
Coe Spring.....	Miner'l water.	.....	Madrone.....	H. & C. Coe.....	..... Madrone
Drischmeyer Brick Works.....	Bricks.	25	San Jose.....	Henry Driesohmeyer, Own.	.....San Jose
Flynn Quarry.....	Sand-stone.	.....	2½ m S of Hillsdale	Seales Est., Own.....	....Hillsdale
Guadaloupe.....	Quick-silver.	.....	6 m E of Los Gatos..	Jas. V. Coleman, Own	.....S. F.
Gilroy Hot Springs..	Miner'l water.	.....	14 m N E of Gilroy.....	Geo. W. Roof. Own...	.....Gilroy
Goodrich Quarry.....	Sand-stone.	25	½ m E of Graystone.....	J. Pfeiffer, Supt.....	.....San Jose
Gay Quarry.....	Mac-adam.	8	2 m S of San Jose.....	H. B. Burns, Supt....	.....San Jose
Hillsdale.	Quick-silver.	.....	½ m W of Hillsdale.....	G. Proonis, Own.....	.....San Jose
Los Gatos Quarry....	Lime.	.....	1½ m E of Los Gatos.	J. W. Taylor, Own....	.....S. F.
Main Well.....	Oil.	.....	2 m E of Los Gatos.....	H. H. Main, Own.....	.....Los Gatos
McPherson Well.....	"	.....	2 m SW of Alma Station.	A. McPherson, Supt..	.....Alma
Madrone Springs.....	Miner'l water	.....	12 m E of Madrone Stat'n	H. G. Dyer, Supt.....	.....Madrone
New Almaden.....	Quick-silver.	255	15 m S of San Jose.....	C. Derby, Supt.; R. B. Bulmore, Agt. at Mine	.....Hacienda
Natural Gasoline Acid Gas.....	.....	.....	New Almaden.....	G. W. Myer, Supt.....	.....San Jose
Pacific Congress Sp'g	.....	.....	10 m S W of San Jose....	J. T. Pfetch, Supt....	.....Saratoga
Peterson Brick Co....	Bricks.	55	San Jose.....	T. W. Peterson, Supt.	..... San Jose
Remillard Brick Co..	"	60	San Jose.....	C. Sunard, Supt.....	.....San Jose
San Jose Water Co..	.....	.....	San Jose.....	W. J. Wilcox, Supt...	.....San Jose
Santa Clara Water Works.....	.....	.....	Santa Clara.....	C. E. Moore, Supt.....	.....Santa Clara
San Jose Brick Co....	Bricks.	150	1 m W of San Jose.....	J. E. Nelson, Supt....	J. M. O'Keefe, Secy, San Jose
Stanford Quarry.....	Sand-stone.	.....	At Graystone.....	Goodrich Est.....	..... Graystone
Western Granite Co..	"	.....	8 m S of San Jose.....	Western Granite Co., Own.	.....San Jose

SHASTA COUNTY.

Altoona.....	Quick-silver.	50	16 m N of Castella.....	J. B. Studges, Owner.	.....Cinnabar
Alliance, The.....	Gold.	2	5 m W of Redding.....	Mrs. Lathrop, Own...	.....Redding
Alvina	"	2	4 m W of Hosetown.....	E. P. Connor, Own....	.....Redding
Annie.....	"	2	2 m W of Shasta	P. P. Willett, Own...	.....Shasta
Anderson.....	Bricks.	30	2 m N W of Anderson...	Holt & Gregg, Own...	.....Red Bluff
Andovina.....	Gold.	2	3 m W of Redding.....	H. Christian & Mrs. Dolebein, Own.	.....Redding
Brunswick	"	10	5 m W of French Gulch..	F. Rossi & H. Cochran, Own.	.....French Gulch
Big Four.	"		4 m S W of Shasta.....	F. Koorney, Supt.....	..... Shasta
Bonnie Belle.....	"	4	2½ m N E of Shasta.....	J. A. Kahn & C. Burbacker, Own	..... Shasta
Bullara & Vanderer..	"	2 7	12 m N W of Redding....	Bullara & Vanderer, Own.	..... Shasta
Black & Brown Bear.	"	.....	6½ m W of Kenneth.....	G. Bliss, Own.....	.....New York
Black Bone.....	"	2	4 m S W of Kenneth.....	D. McCarty et al, Own	..... Shasta
Balakala.....	"	6	1 m N W of Colbey.....	— Murray et al, Own.	..... Shasta
Billy McCormick....	"	2	13 m N W of Ono.....	S. W. Robinson, Own.	.....Igo

—* Begun in issue of April 25, '96. (To Be Continued.)



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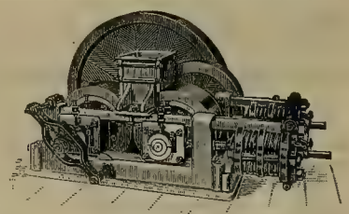

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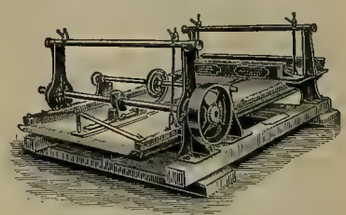

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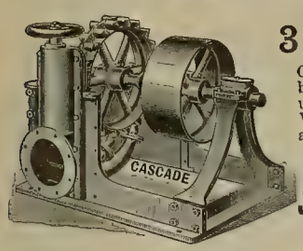

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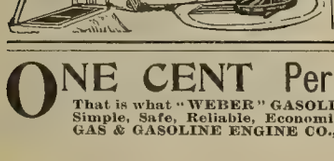

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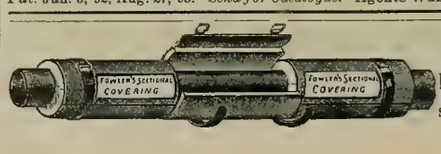

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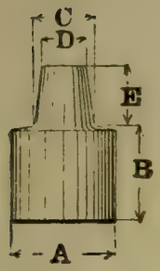

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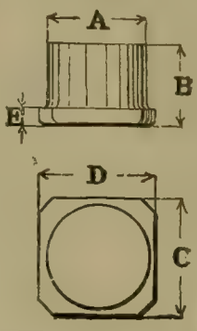

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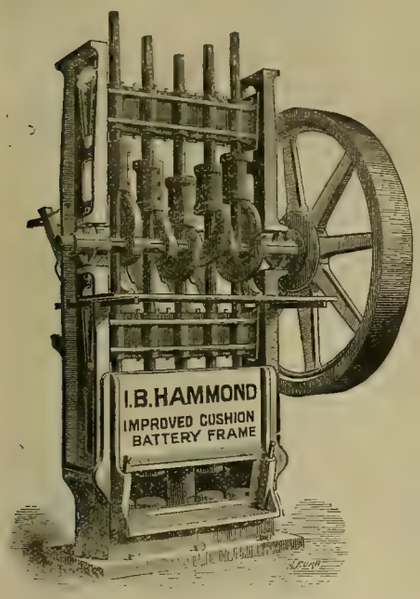

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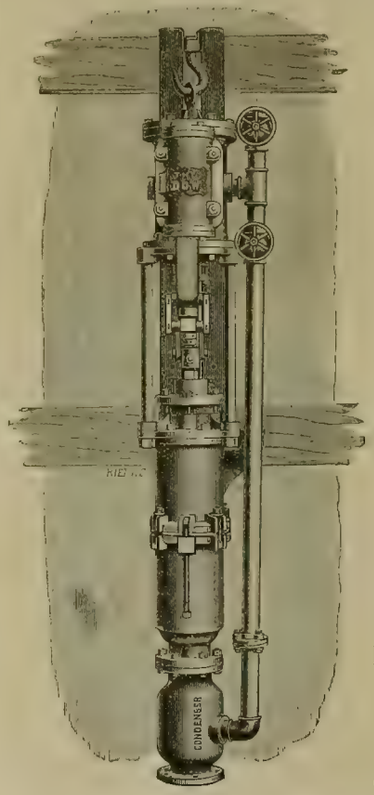

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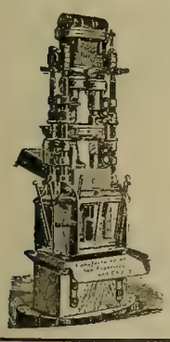

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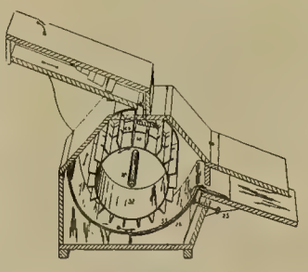

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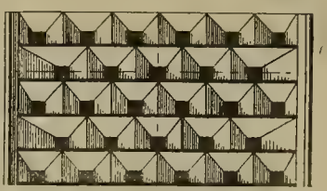

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Mining Summary.

CALIFORNIA.

Amador.

A 10-stamp mill was purchased last week for the Good Hope mine at Jackson. The shaft has been retimbered and enlarged and will be sunk to 600 feet and tunnels run north and south.

At the South Eureka at Sutter creek development work is being pushed. Of a total of 60 men on the pay roll 26 are on development work. The present ore supply for the mill comes from the 900 and 1050 levels. An upraise of 200 feet has been made in the ore shoot from the 900-foot level. On the 600-foot level the main drift is being advanced southeast to cut the ore body encountered on the 900-foot level. The 1250-foot station has been completed and a crosscut and drift started toward the shoot estimated to be something less than 850 feet distant.

Butte.

(Special Correspondence). — The Catskill (drift) gravel mine, one mile north of Bangor, owned by C. S. Bareford, was worked till Feb., '96, by 30 to 50 men, through a shaft down 200 feet. Water drove them out. The Groves gravel mine joins the Catskill on southwest.

The Derbec G. M. Co. own 40 acres of this channel 3 miles west of Bangor. It is thought they will purchase the entire blue lead of this section, and then proceed to mine on an extensive scale by running a tunnel in on bedrock at the Rocky Honcut.

At the Gold Bank mine, the most prominent at Forbestown, owned by H. P. Stow & Co., H. P. Stow is superintendent and L. D. Johnson is assistant superintendent. This property consists of four patented claims, the Gold Bank, Pine Grove, Mammoth and Church. The ore body of the whole runs east and west, and pitches north between a foot wall of greenstone and a diabase hanging wall. It averages 12 feet, all of which pays to work. The improvements on this property consist of hoisting works, a 40-stamp mill with 16 concentrators, 2 canvass plants, chlorination works and air compressor, all run by water power, of which they have an abundance. The development consists of 6 tunnels and 1 shaft down 360 feet on the incline of the vein. They are at present working 150 men in mine and mill, and extract and crush about 143 tons of rock every 24 hours. This is one of the best ventilated mines in the State. In 9 years working no accident has occurred to life or limb. The same water that runs the hoist and mill is again picked up and used to run the compressor. They are now engaged in running a hard rock crosscut tunnel, which, when completed, will tap the ledge at 500 feet vertical below the present workings. It is now in 1600 feet, and they are momentarily expecting to strike the ore body, in which event they will move their mill and other buildings necessary below the mouth of this tunnel.

At the Denver mine, owned by H. H. Noble of San Francisco, 3 miles northwest of Forbestown, Jos. Floyd is superintendent; working 16 men, mining and milling 25 tons of ore daily. The rock is classed as low grade but pays.

The Shakespeare mine, located adjoining Forbestown, owned by C. J. Nickerson & Co., is idle at present. The Golden Queen mine, adjoining the above, owned by C. J. Nickerson & Co., is temporarily idle in anticipation of its changing hands. In case of its not being sold the present owners will resume active work.

The Burlington consolidated mine, a newly organized company, owned by R. R. Grayson & Co., and located in the same vicinity, will probably do some extensive development work soon. The Carlisle mine, 2 miles from Forbestown, on the Feather river, owned by Carlisle & Grayson, is at present idle, but is soon to resume.

The Good Hope mine, Lincoln mining district, near Enterprise, 5 miles from Forbestown, on Macabees creek, is owned and managed by D. Burroughs. It consists of a 5-foot ledge running east and west, and stands nearly vertical. They have a hoist run by water. The mine is being developed through a shaft now down 50 feet. L. P. Mc.

Register: W. McMillan will put four men on the Resumption quartz mine at Hurleton to get out ore.

The old Mount Hope quartz mine, above Forbestown, has been bonded by a Chicago company and seven men have been set to work on it. They are running a drain tunnel at present.

The Magalia drift mine at present is working but few men, owing to the fact that the water which is being pumped from the old works was tapped about ten days ago.

G. F. Ditzler and several others are preparing to open up a new mine in South Thermalito, about a quarter of a mile above the Treat mine.

Calaveras.

Record: The machinery for the South Paloma mine has arrived and will soon be put in place. The shaft is down 160 feet, and when the hoisting machinery is finished sinking will be continued to the depth of 600 feet before any drifting will be done. The ore body is 5 to 12 feet wide, showing well in sulphurets.

At present everything at the Gwin mine is at a standstill, on account of the supply of water having been cut off because of a broken flume some distance in the mountains.

Active operations have been resumed on the Three B gravel mine on the Calaveras river. The necessary machinery for obtaining power from the river is now being put in, and a mill for crushing the gravel, which is cemented, is to be erected.

Mountain Echo: Hamilton & Hackney are preparing to open up their mine, situated immediately south of the Cherokee mine, in Altaville mining district. In a few days the machinery will be put in position and the work of sinking the shaft will be commenced.

A rich strike is reported at the Thorpe mine on the 500-foot level.

The Goat Ranch mine in Angels mining district is making quite a showing. The shaft is now 80 feet in depth and a 3-foot vein discovered.

El Dorado.

(Special Correspondence).—The Blanchard has reached a depth of 50 feet on a 7-foot ledge of good ore. The new steam hoist is in operation.

Notices for contract work in the development of new properties are becoming quite numerous in this locality.

Additional steam machinery for power is being placed this week on the Larkin. The double compartment shaft has reached 250 feet.

J. C. Shephard is sinking a shaft on the Mule mine 2½ miles northeast of Greenwood. The shaft is down 30 feet on a 9-foot ledge.

The Eagle King, near Grizzly Flats, at 250 feet has a 3-foot ledge of high-grade ore. A 10-stamp mill is in operation.

John Smith has 3000 feet known as the Aultruan mine, 2½ miles east of Greenwood, on which he has a tunnel 500 foot long, crosscutting the ledge at a depth of 250 feet. The ledge is said to be 40 feet wide on top running to a width of 100 feet in low-grade ore.

Placerville, July 6, 1896.

Humboldt.

Blue Lakes *Advocate:* The Sugar Bowl Mining Co. has completed its ditch, two and one-half miles long, to their mine on the Trinity river, near the Hoopa reservation. The water will be brought to the claim from Campbell creek.

Inyo.

Inyo *Register:* The Hanchett Co. is working twenty-four men in the Soldier Boy mine at Silver Peak, and has sent to Austin for about twenty more. With an increased number of miners the mill can be kept running two-thirds of the time. The stamps are dropping at present.

Kern.

Porterville *Enterprise:* Murry, Putnam and Hayes had been prospecting near Lander's mill on the Mojave desert, township 28, range 40 E., for a lost mine called the Yellow Jacket, which they found and re-located. They also located another claim and did considerable work on it. While working the latter Putnam and Hayes came across some black looking float rock which they found to be gold bearing quartz, shortly afterward finding the ledge it came from. They hauled 2150 pounds of the ore seventy-five miles, over the desert and Walker's Pass to Tibbett's mill at Kernville and realized about $60, demonstrating the ledge to be rich enough to be practically worked in that out-of-the-way place. This ledge runs almost north and south with hanging wall porphyry, foot wall granite, and talc seam on each side of the ledge. The country around is very broken, with dykes of porphyry cropping out. It has not one redeeming feature outside of its gold properties, as the only wood is sage-brush and the nearest water is at Lander's mill, six miles north.

Placer.

Leary & Chapman are putting on new machinery on the Green mine at Ophir, which has been shut down for the last twenty years. They propose reopening the old shaft, about 200 feet deep, and sinking 200 feet deeper.

The Marguerite Co. at Auburn continue advancing the crosscut on the 300-foot level toward the old Salsig ledge.

At Forest Hill the Westchester drift mine is being reopened. The face of the new tunnel is in the old works, which have to be crossed to reach the unbroken ground.

The Basin Consolidated Co. have let a contract for the construction of 800 feet of bedrock tunnel in their mine at Deadwood.

A strike of very rich gravel is reported from the Red Point mine at Damascus.

The Mayflower Co. at Forest Hill have commenced an upraise to develop the extension of the upper channel mined in front of the Paragon mine. This channel in the latter claim was directly over and 160 feet higher than the bedrock bottom channel. Its width was from 300 to 500 feet, and up to where cut away by the Orono channel its total yield aggregated nearly $1,000,000.

Plumas.

(Special Correspondence). — The Harrison quartz mine, Granite mining district, on Croquetto creek, twenty-three miles south of Quincy, J. J. Lawrence superintendent, has an ore body of 3 feet thick; being developed through a tunnel now in 250 feet which taps the ledge 100 feet from the croppings. Drifts have been run 250 feet northeast and 75 feet southwest. Their improvements consist of a 10-stamp mill run by water power. Their rock is free milling, carrying 2% of sulphurets, which they are not at present saving. It is rated as low-grade ore, averages about $5 per ton. They are working seven men, and mine and mill about thirty tons of rock per day.

Quincy is reached from Oroville traveling northeast by Conley and Neal's stages, three times a week, distance sixty-five miles, and from Reno, Nev., via Narrow Gauge R. R. to Clairville, thence by stage forty-three miles.

The Elizabethtown channel gravel mine, one and one-half miles north of Quincy, is a corporation with $100,000 capital stock, principal office located at San Jose; W. H. S. Beach is superintendent. This company have leased this property of the owners; its extent is half a mile in length of an ancient channel, 100 feet to 200 feet in width. It is a drift mine, and is being developed through a shaft down to bed rock, 100 feet deep, at the bottom of which a tunnel has been run, now in 112 feet, and from which drifting is now going on. They have a steam hoist, and sluices in course of construction. It has lately started having been idle since January, being then driven out by water, just as they had struck pay gravel. As the channel above this mine supported some 2000 people in the early sixties, it is looked upon as one of the coming gravel mines in this end of the State. They are working twenty men at this writing, but expect to double that force.

The Plumas Imperial gravel mine, owned and managed by C. D. Hazzard, is five miles southwest of Quincy. This property consists of about 1000 acres of mining ground, covered by U. S. patent. They are operating three monitors from 4300 feet of pipe. This mine has been in operation for many years, but has only been in the exclusive possession of Mr. Hazzard for the last two years. Twelve men are employed, and the output is satisfactory.

The Quincy Mining and Water Co., is a corporation, the operations of which are located about six miles west of Quincy. The principal owners are James O'Brien and A. B. White. The former is general manager, and the latter superintendent. The water supply of this corporation is taken from Spanish creek and Silver and Gold lakes, and their main canal is thirty miles in length, conveying a constant supply of 1200 inches of water. Their mines consist of the Gopher Hill gravel mine, working ten men, with one monitor, and the Bean Hill gravel mine, worked by ground sluice, employing seven men. Upon these two mines, which cover some 2200 acres, they have over 600 feet of 15-inch and 22-inch pipe. The Bean Hill mine is worked night and day, and can be successfully operated from February to July of each year. These are known to have been good paying mines for many years. The present management have been running them for the last three years. They have but little blasting to do, seldom more than 5 or 6 feet of pipe clay at any time. L. P. Mc.

San Bernardino.

The Memphis quartz mine at Gold Mountain has been bonded for $17,500 to Chas. Lane of the Utica mine. Under his direction some development work has been done and a satisfactory mill test made. Operations have been temporarily suspended by shortness of water supply.

At the Rose quartz mine, in Marengo district, the company is preparing to sink a new main shaft. East of the Rose mine several claims are being prospected in a small way, with results that promise the development of some good mines.

The Holcomb Valley Co. L't'd. has fifteen men employed drifting in Coarse Gold gulch. A new steam-power hoist has been put up.

Shasta.

Free Press: The development of the Niagara mine near French Gulch is going steadily on under the management of R. E. Hanley. Some three weeks since the miners employed by the company in the O'Neil tunnel lost the ledge. Mr. Hanley directed them to push on. A small stringer of the ledge was soon encountered, and developed into a ledge of very rich sulphuret ore four feet in width. The rock is being shipped to the Selby Smelting and Lead Company at Vallejo Junction for reduction.

Sierra.

The new main tunnel being run in the South Fork ground at Forest City is within less than a hundred feet of the deep, lava-capped channel. A large dump is being made at the mouth of the tunnel, and the old-time Bald Mountain engine is to be used to haul out the gravel, etc.

The Bunker Hill and North America drift mines at Gibsonville have been sold to an English company.

Siskiyou.

Journal: The Wright & Fletcher mine, as well as the Gardner mine, will run until the middle of July before making their cleanup. The supply of water for these mines has held out exceedingly well this year.

The Empire quartz mine on Empire creek, Klamath river, is now looking well. A good, permanent lode has been found which prospects handsomely.

The McConnell & Quinn claim is now busy hoisting. They are down about 15 feet and are making splendid progress. The China company that is working the claim will no doubt take out plenty of money this season, as the mine is known to be rich, especially in the vicinity in which they are now working.

Steele and Scheld cleaned up about $900 from their arrastra the first of the week, the result of a few weeks' run from their ledge on Long gulch, about a mile from Hawkinsville. The rock averages about $55 a ton.

The Distlehorst and Barton Klamath River Dredging Company expects to get hoisting between the 20th and the end of this month. The people along the river are watching the outcome of this new enterprise with a good deal of interest. The only doubt of its success has been through the character of the ground in the Klamath, which is filled with immense boulders, with the pay on bedrock.

Last week Eastlick Bros. made a cleanup in their mine at Oro Fino amounting to over $12,000. It was made from ground on which stood the old town of Oro Fino.

Trinity.

Journal: The Sherwood mine, New River district, is showing up well. The mine is running under the management of John Bartlett. They have a good ledge and are taking out ore. The mill will be kept going as long as water lasts.

F. Ladd while ground sluicing the surface of the Mountain Boomer uncovered a rich ledge of decomposed quartz.

S. B. Brooks has commenced operations on the Mary Blaine.

Journal: Last week 88 flasks of quicksilver valued at $3500 were shipped to San Francisco from the Altoona mine.

Great improvements are being made on the placer mines of the Minersville Hy. G. M. Co. at Minersville, and 120 men have been employed for some time past. The wires are now being strung to give telephonic communication with all parts of the property, an electric plant is under construction, and a saw mill is now being erected. The second ditch with a capacity of 2500 inches and the mine is now supplied with over 400 inches of water.

Geo. La Blanc has discovered a ledge of gold bearing quartz on Copper Creek about five miles above Trinity Center. The rock is said to go about $8 per ton.

Yuba.

Democrat: Chicago capitalists had bonded the old Beehive quartz mine and mill near Woodville House. It is stated that seven men are at work under superintendency of Oliver Roberts, and the mine will be opened in good shape.

NEVADA.

ESMERALDA COUNTY.

Ex-Governor Colcord authorizes a correction of the local statement as to the cyanide test of Aurora ore. It does not yield $34 by the cyanide process as stated, as it has never been tested, but will soon, the ore having been sent there for that purpose. It is then expected to yield about $10 a ton.

STOREY COUNTY.

The joint Confidence, Challenge Con. and Con. Imperial west crosscut No. 1 from the surface tunnel is in 557 feet. The face is in porphyry.

In the Crown Point mine the raise from the south drift on the 700-foot level is up 95 feet. The top is in porphyry, with bunches of gold ore through it. The assays from these bunches run from $9 to $12 per ton.

The Belcher mine yielded no ore during the past week. Of the accumulated ore there was shipped to the Brunswick mill 452 tons and 1740 pounds, the average battery sample of which showed a value of $19.56 per ton, and the gross yield of bullion amounted to $7485.07.

No ore was extracted from the Seg. Belcher mine during the past week. There was shipped to the Brunswick mill 171 tons and 60 pounds of ore previously accumulated. The average battery sample assay of the same was $19.67 per ton, and the gross yield in bullion was valued at $3113.95.

In the Savage mine on the 850-foot level they are still stoping ore north and south from the upraise from east crosscut No. 3 up to the 750-foot level. In east crosscut No. 1, on the third floor of the north upraise, they have started a south prospecting drift and advanced it 15 feet in porphyry and quartz giving low assay. During the past week they hoisted eighty-five cars of ore. The car samples average $22.68 per ton. Shipped to the Nevada mill forty-five tons of ore. Shipped to the United States Mint at Carson, July 6th, 457 pounds of bullion, being the cleanup for the month of June. Assay value $11,327.48—$3318.08 gold and $8009.40 silver.

OREGON.

JACKSON COUNTY.

Democratic Times: Work on the Snowgoose ledge, near Steinman, is progressing favorably. A tunnel 140 feet in length to tap the ledge is nearly completed.

The Monmouth Mining Co. of Beaver creek district has started a new tunnel to tap their ledge at a considerable depth. The tunnel will be over 400 feet in length.

Tidings: J. Briner, from the Beaver creek section, reports that the Monmouth Co., which is developing a big ledge in that section, between Bumble Bee and Hungry creek, is starting in on a new tunnel which will tap the ledge at a considerable depth and will be some 400 feet in length. This ledge is one that has been traced a long distance on that side of the Siskiyous, and has also been traced on the north side of these mountains, in Oregon.

WASHINGTON.

Intelligencer: J. Rigby from Cascade district, reports that the ores of Cascade district, while they are known as silver-lead, and are just the kind smelters need the most, carry from $10 to $20 gold, from $30 to $60 silver and from 30 to 60 per cent lead. They are equally as good as the ores of the Kaslo-Slocan county, that are enriching so many mine owners in that section, and are so eagerly taken by the smelters all over the country.

W. C. Butler manager of the Colby-Hoyt mining properties in the Monte Cristo district, confirms the report sent out early in the week of a strike in the Mystery mine, about 3200 feet below the point where croppings of the Pride of the Mountains lead appear above and about 1200 feet below the upper tunnel, in which work is now being carried on.

BRITISH COLUMBIA.

Tribune: The Slocan Boy, which is under bond and leased to Gibson & Keith, has again started up, and from this on will make regular shipments. They have reached the 200-foot level with the shaft and expect to have to crosscut about 30 feet to cut the vein.

The B. C. *Gazette* contains notices of the incorporation of the Alliance Prospecting Syndicate, Ltd., Vancouver; capital stock, $100,000; H. B. and D. B. Irving, and H. Clyne. Emu Mining Syndicate Ltd., head office in England; capital, £10,000. Eric Gold Mining Co., Ltd., Rossland; capital stock, $1,000,000; F. W. Rolt, E. Bowers, J. Hunter, W. H. Lancaster and W. A. Campbell. Green Crown Milling and Mining Co., Ltd., of Spokone, has registered as a foreign company to mine in British Columbia; capital stock, $1,000,000. Mount Adams Mining Co., Ltd., New Denver; capital, $150,000; R. C. Adams, Midway, W. C. Adams, Sandon, and R. B. Kerr, New Denver. Queen G. and S. M. Co., Vancouver; capital stock, $500,000; B. Douglas, Westminster, W. Teague, Yale, and J. McQuillan, Vancouver, are trustees. Red Moun-

tain View G. M. Co., Ltd., Rossland: capital, $1,000,000; W. G. Johnson, W. W. Spinks and I. N. Campbell, Rossland. Victoria Mining and Development Co., Ltd: capital stock, $1,000,000; J. Bryden, M. McGregor and J. E. Martin, Victoria.

At a special meeting of the Maud Hydraulic Co., held recently at Vancouver, the terms of sale of the Maud hydraulic mine were stated to be $5000 within ten days, $15,000 within ninety days and $50,000 before January 1st, '97.

Ashcroft Journal: The first of July still finds the problem of river dredging unsolved. There are now three dredgers on the Fraser not far from Lillooet, one of them built at an expense of about $40,000, one a small affair which and in connection with it about $20,000 has been expended and one that but little is known about, called the Dominion Gold dredger. We understand that at present none are in operation, the big one having been again shut down, probably only temporarily. The small one has made, under favorable conditions, from $50 to $100 in a day, but has not been able to work to advantage, owing to size, length of pipe, etc. At Quesnelle the Fader dredger was at work for some days and washed up about $85 in all. The pump did not work satisfactorily. New machinery will be added and the machine started again, but how soon, we are unable to say, as there is some litigation in prospect. The Underwood dredger, at a cost of $26,000 is a well built machine. It has been tried for a few days but the management have found it advisable to make some change in the machinery and Col. Underwood, the manager, is now in Chicago, expecting soon to return. The Pittsburg company's dredge, Mr. Young in charge, is a well and substantially built machine and, as is the Underwood, very complete. The engines on both these huge dredgers will easily drive them against the swift-running current of the Quesnelle or Fraser, there being four complete engines on each and on the Pittsburg a small electric light engine besides. The Young dredger is now about completed and will soon be working. Another dredger for the Alexandria company is started at Quesnelle for work on the Fraser and another projected for the Quesnelle river above the Underwood leases. We are informed by Col. Underwood that after they have their present dredger, "Pioneer No. 1," working successfully, the company intend building three or four more. It is the same with the Pittsburg company, if successful, or if any one of the numerous designs are made to work satisfactorily, dredgers by the score will be built for operation on the rivers of Cariboo. The estimated cost so far would be, for the six plants already put in or about completed, in the neighborhood of $150,000. The best-informed men in this section think that dredging will be successfully done, but that much time and money will yet be spent in experimenting before this happy result is accomplished.

ALASKA.

Mining Record: Another find was made on the Silver Queen at Sheep Creek a few days ago. From the banging walls within 18 inches of the main tunnel was taken some very rich ore which assays from $300 to $700 per ton. The Topeka will take about 30 tons of this ore and of concentrates on her trip down this week to the smelting works at Tacoma.

UTAH.

Bulletin: Following are the ore shipments from Bingham for the month ending June 30th:

	Tons.
Old Jordan & Galena	500
Old Telegraph	1800
Spanish	185
Northern Chief	200
Tiawaukee	50
Petro	100
Petro lease	75
Neptune	30
Markham group	35
Dalton & Lark	2320
Keystone	20
Fortune	40
Golden Opportunity	100
Antelope	20
Judge Shoppe	20
Lead mine, Sessions & Snyder lease	60
Phœnix	150
Spanish	100
Peabody	20
Summit	20
Black Dog	20
All other sources	150
Total tons	6015

The shipments from Bingham for the six months ending June 30th were:

	Tons.
January	4842
February	4822
March	6701
April	6866
May	7457
June	6015
Total	36,703

Tribune: The float is so rich and so plentiful in State Line that the Rice brothers, who own a group of five claims there, find it pays to ship it, and are confining their labors so far to sacking the boulders that they find on the surface.

Within the last few days some rich gold strikes have been made at the half-year-old State Line district, and the infant camp has suddenly taken a new lease in life. A week ago a vein of quartz heavy with gold was found in the Ophir mine, formerly considered a silver property, and since then similar discoveries have been reported almost daily.

Tribune: Drilling will be begun on the East Golden Gate at Mercur, at a depth of 360 feet, the point reached by the double compartment shaft. As the steel drill burrows into the rock at a speed of 20 to 50 feet daily, when operated the full twenty-four hours, the officers of the company believe that by August 1st they will know the extent and size of the ore bodies of the camp, in which at present about 500 feet is the greatest depth attained in the workings of any mine. Assays of the strata, made at 5-foot intervals, will prove invaluable to them as well as other operators in the camp. The drilling may be continued to an even greater depth and the Rand method will be employed at various places to thoroughly prospect the property.

IDAHO.

Coeur d'Alene Miner: The tunnel in the Union, just below Gem, is now in 300 feet and is expected to strike the ledge in 150 to 175 feet more. They are following a small stringer in which they find more or less ore.

Foster & Co. struck a fine body of concentrating ore in the shaft of the Belle of the West, on Nine Mile, a few days ago, but the water drove them out. They are now driving a crosscut to reach the ledge about the same point as the bottom of the shaft. They have but a few feet farther to go.

Spokesman Review: "I believe the mines in the vicinity of the North Fork of Salmon river will come to the front, and that very soon," says W. H. Macvin. "The mines are about six miles from North Fork, a station on the Nelson & Fort Sheppard railway. The character of the ore so far discovered is iron sulphates, galena and copper. The principal locations thus far made which give evidences of being mines are the Ben Harrison, Maud S., Arnold, Idaho and McDonald. On the Maud S. fine steel galena and gray copper, running high in silver, has been uncovered; but little work, however has been done on the claim. More development has been done on the Ben Hassan and Arnold than on the others. There is a 30-foot shaft on the Arnold and a 5-foot crosscut. As yet there is no sign of the hanging walls.

"The Ben Hassan is developed by a 15-foot shaft. While there were no indications of gold on the surface, the assays at 10 feet showed $7 to $10 in gold and 30 ounces of silver.

"The formation in this country is syenite, porphyry and granite. There are big dykes of quartzite-porphyry and usually between these dykes the ledges are found. It is easy of access."

Tribune: From the annual report of the DeLamar M. Co., Ltd., the following data is taken: During the twelve months the company shipped and received returns from smelters as follows:

	Tons.	Returns.
First-class	99,391	$80,384 22
Second-class	56,710	14,089 52
Concentrates	1935	2,906 02
Totals	161,036	$77,379 76

These gave an average, respectively, of $607.54, $248.45 and $588 86 per ton.

There was in transit 32 tons 771 pounds, embracing the three classes above, estimated at $13,383.07. This makes a total of 193 tons 807 pounds shipped, aggregating $90,762.83. These smelting ores cost the company:

Labor and supplies	$24,713 38
Labor collecting concentrates	1,008 09
Salary of agent	1,200 00
Freight and charges	5,588 25
Total	$32,600 62

Leaving a profit of $58,162.21.

The mill crushed 45,687 tons 25 pounds of ore, the assay of which was $25.40 per ton, divided into gold $18.34 and silver $7.06. The mill worked up to a saving of 78.11 per cent, according to assay, while the bullion returns were 76.57 per cent. Number of bars produced, 260; ounces pure gold, 24,500; ounces fine silver, $434,310.

Value of gold realized	$505,010 13
Value of silver realized	288,928 05
Add for slag, etc., realized	5,758 78
Amount belonging to 1895, realized this year	6,565 07
Total	$806,262 03

The 30-stamp mill ran 350 days 5 hours, and crushed an average of 3 tons 818 pounds dry ore per diem.

The cost of mining and milling was: For mining, including all mine work, retimbering, etc., $5.52 per ton, and for milling, $5.33 per ton—a total of $10.85 per ton. Four dividends were paid, aggregating $80,000, or at the rate of 20 per cent per annum upon the capital stock of the company.

MONTANA.

Record: The Bimetallic Company at Granite is engaged in taking the water out of the shaft of one of their mines, and have a force of men driving the remaining 300 feet of the long tunnel. The company will erect a 60-ton concentrator immediately to work the 20,000 tons of low grade ore now on the dump.

Spokesman-Review: Otto Abeling, superintendent of the Snowshoe mine, near Libby, Mont., reports that the work in both the mine and mill was going on nicely. A recent shipment of sixty tons of concentrates gave 60 per cent lead, 20 ounces silver and $4 in gold. The concentrator is now turning out ten tons of concentrates a day. The shipments have been about 400 tons for the past two months.

Miner: Work has been commenced on the great drain tunnel at Phillipsburg. This tunnel, when complete, will be one mile in length and will drain the Bimetallic and Granite mines at a great depth.

Mountaineer: The Iron Mask mine, which is situated on the top of the White Horse range, at the head of Whipcracker gulch, six miles from Bedford, Jefferson county, was last week sold to Helena and Eastern capitalists for $49,000. The Iron Mask is already a well developed mine, having a shaft down 338 feet. Levels have been run every 50 and 75 feet out on the vein 400 feet, all of which are in good ore. There is 2000 tons of shipping ore on the dump ready for the smelter. The vein is a strong one, 3 to 6 feet wide. Past shipments netted from $300 to $600 per car in lead and silver.

SOUTH DAKOTA.

Times: The Hawkeye M. & M. Co. is now operating twenty stamps on ore from the vein recently opened up on the 150-foot level. The vein is exposed for 60 feet in width in the large stope on the level mentioned. The ore extracted all comes from a new shaft now being sunk about the center of the stope. As soon as it is down 50 feet another stope will be excavated and additional men employed. Twenty-five names are on the pay roll.

A vein of high-grade gold ore has been struck by I Doerstler in one of his claims, situated in Carbonate, about 1500 feet northeast of the Yankee Boy shaft. The rock shows free gold in profusion. The vein is apparently a vertical one, coming up through the slate. The ore is very similar in appearance to the high-grade stuff now being taken from the Durango and Reddy mines, situated in the vicinity of Lead, on the Poorman divide.

A discovery of rich siliceous ore has been made in the old workings of the Strong Bull mine in Galena Camp. The ore is highly crystallized and reported to assay $60 gold per ton. When the mine was operated years ago by Davey & Son nothing was known of this character of ore, and it went over the dump as waste. The discovery tends to prove that these ore deposits are continuous from Ragged Top to Galena, a distance of about twelve miles.

Pioneer: Two shifts of men are at work on the Copper Mountain lode, adjoining the Gray Eagle property, in the southern Hills. A 160-foot drift has been run 200 feet from the surface, in which rich copper prospects were found. Copper deposits of considerable extent have been encountered in various places in the immediate vicinity.

Encouraging reports are received from the new finds on the north fork of Castle creek, about five miles from Rochford. Hooper & Mendenhall are still taking out good ore and Fullerton and others own four claims on the ledge on which the rich find was made sometime ago. The ore is a sandy quartzite and free milling.

MICHIGAN.

In the Tamarack the unusual spectacle is presented of a mine which pays smaller profits as it grows larger. The Tamarack copper mine is a continuation of the conglomerate lode on which the Calumet & Hecla was developed. The Calumet & Hecla was started from the outcrop of the vein, which dips at an angle of 37½ degrees toward the northwest, and the shafts followed the incline of the vein. The conglomerate extends a long distance north and south of the Calumet & Hecla holdings, but on both sides of the big mine has been found either barren of copper, or containing so little metal that the lode could not be profitably worked. The Tamarack Company got the continuation of the lode by buying land, under which the conglomerate passed at a great depth, and began sinking its first shaft in 1883. The conglomerate was reached at a depth of 2262 feet several years later. The Tamarack paid its first dividend in April, 1888, with profits of $11 per share that year, followed in 1889 by dividends of $16 per share, dropping to $13 in 1890, rising once more to $16 in 1891, falling to $12 in 1892 and the same in 1893, and $8 each for 1894 and 1895. The official figures furnished by the directorate show that the Tamarack paid dividends of $600,000 during the eighteen months ending December 31, 1895, while during the same period the net mining profits were but $476,774.55, the amount of $123,225.45 having been taken from the surplus or from moneys received from sale of the new stock, in addition to the actual net mining profits in order to pay the dividends, which were at the rate of $8 per annum. In addition to this, the sum of $449,698.53 was expended during these eighteen months in construction work. No. 5 shaft of the Tamarack, now 350 feet deep, will require four or five years to bottom.

The Tamarack charges the cost of sinking shafts and buying new machinery, erecting new buildings, and the cost of all other work of like nature, to the construction account.

During the ten years ending with 1895, the expenditures of the Tamarack, under the head of construction, amounted to $2,060,385.12.

Total production refined copper for 1895, pounds, 14,000,800; cubic fathoms conglomerate broken, pounds, 16,592; total rock hauled from conglomerate workings, tons, 304,020; total amount of rock stamped, tons, 203,197; percentage of mineral in stamped rock, per cent 3.31; percentage of refined copper in stamped rock, per cent, 2.48; percentage of refined copper in mineral, 73.97; yield of mineral per cubic fathom, pounds, 1.120; yield of refined copper per ton of rock stamped, 48.74; yield of "refined copper" per cubic fathom, pounds, 8.39; refined copper cost per pound at mine, cents, 5.18; total cost of smelting, freight and handling, cents, 1.53; cost per pound of refined copper, cents, 6.70; construction, 2.39; cost of sinking per foot shafts 25.61; cost of sinking per foot winzes, $11.23; cost of drifting per foot $9.29⅔; cost of sinking per fathom, $11.44. No. 2 shaft sunk 4012 feet.

COLORADO.

Republican: For the month of June the shipments of ore from the Cripple Creek district aggregated 10,500 tons. Probably 4000 tons additional of low-grade ore was treated in the local mills.

News: At Leadville last winter a few merchants organized a company, each pledging himself to pay $10 into the treasury until a sufficient working capital had been secured to commence operations. There is now in the treasury almost $4000, providing an ample fund to defray all preliminary expenses. Recently another co-operative company has been formed on a slightly different basis. The new company takes in fifty members, who pay $50 each and $20 per month, thus insuring a capital of $2500 and $1000 a month as a working fund. The new company has leased a group of claims on Carbonate hill, south of the Mahala and west of the great Iron Silver property.

ASPEN.—Attention of leasers, prospectors and investors looking for ruputed good things in the mining line is just now divided between the Woody section, on the Aspen contact, and Old Ashcroft, where H. A. W. Tabor has some properties, says the *News*. In the first named section a large amount of work is being done on claims that have lain idle for years, and leases are in excellent demand. The cause of the activity is traceable to the strike recently made in the Leadville property, which continues to ship regularly one that runs in the neighborhood of 150 ounces out and out. The Ashcroft excitement is due to the reported discovery of ore bearing gold to the amount between $5 and $15. This sort of ore is in several of the mines and samples have been shown here, but it is impossible to ascertain the veins are of any extent. The excitement upon the find, however, is manifest in the rush for properties there.

Nearly all the teasers here are making above wages and some are taking out small fortunes, as, for instance, Peter Mcgregor is knocking down ore in the Alta Argent that shows native silver. He only encountered the streak a few weeks ago, and as his lease expires next month he is losing no time in getting out all he possibly can, and has a large force of men at work. Gray and Mason, who are also working a block in this property, are breaking out ore that is way above the average.

Rumors regarding the operations in the Mollie Gibson and Argentum Juanita are as numerous as ever, but it is impossible to obtain anything like definite information concerning these mines. Strike stories of the Gibson are almost of daily occurrence, but the shipments do not bear out the stories.

The agreement spoken of some time ago as in progress looking to the clearing of the Free Silver mine from water has been entered into. The owners of the property some time ago abandoned the work of attempting to keep the shaft clear, but the Smuggler Co., through its manager, S. I. Hallett, has taken a contract not only to free the mine from water, but to drive the shaft an additional 130 feet.

NEW MEXICO.

SIERRA COUNTY.

Silver City *Enterprise*: The largest hydraulic mining deal New Mexico has ever known will be at the placer fields east of Hillsboro, Sierra county. These placers have been worked in a small way on the surface by Mexicans since 1874, and although no water has been obtainable and the gold has been extracted by dry washing, the miners have made good wages.

The people have been prospecting the ground for six months and have spent $20,000 in preliminary work. The auriferous gravel bed is about 60 feet thick, covers 4000 acres and is all pay dirt. Water for working the mines will be impounded at the head of the Animas river by a dam 150 feet high, and will be conducted to the placers through fourteen miles of 30-inch riveted steel pipes and discharged through the monitor nozzles under a pressure of 360 pounds.

The water will then be conducted to basins where the debris is to be impounded and caught up again in a reservoir in the mesa formed by damming the Percha. From this reservoir irrigation canals will conduct the water to about 12,000 acres of arable land between the mesa and the Rio Grande. The estimated cost of the enterprise, including the purchase of the ground and the construction of dams and pipe lines, is about $500,000.

ARIZONA.

Oasis: In the bottom of the main shaft of the Ibex mine, in Mohave county, a very rich body of ore has been struck.

The Crown mine, in Yuma county, is turning out daily 100 cars of $6.50 and $7 ore. Another 100 feet in depth here will increase grade of this ore to $10 easily, as all the ore chutes show that they increase with depth. The mill is crushing 350 tons per day.

SOUTH AFRICA.

Journal: In the Transvaal the Sheba output for May is as follows; The mill ran 29 days, crushing 4,200 tons, averaging 244 tons per stamp per diem. The gold produced is 6,819 ozs. 15 dwts. 6 grs.; 3,350 tons of tailings produced 2,003 ozs. 7 dwts. 1 gr.; 124 tons of concentrates are valued at 1,203 ozs. 11 dwts. 12 grs. Total for the month, 10,026 ozs. 13 dwts. 19 grs.

Personal.

JOS. M. CUMMING succeeds J. H. Culver as secretary of the Mechanics' Institute.

CHAS. BUTTERS is on his way home from Johannisburg and is due here about August 1st.

H. P. GORDON has resigned the superintendency of the Minersville hydraulic mine, Trinity county.

RICHARD A. PARKER, mining engineer, has returned from Johannesburg and was in the city during the early part of the week.

Recent California Mining Incorporations.

Blanchard G. M. Co., Antioch; J. B. Brown, San Francisco; J. Trengove, J. C. Rouse, J. P. Abbott, A. C. Hartley, Antioch; capital stock, $50,000, all subscribed.

American Bar Mining Company, Nevada City; J. T. McCall, C. H. Mallen, F. Zeitler, J. O. Whitney, D. F. Douglass, F. Searls; capital stock, $10,000,00; $8,752,500 subscribed.

Recently Declared Mining Dividends.

The Osceola, Mich., Copper Mining Co., $1 per share on the 25th; a total of $2,072,500.

Coast Industrial Notes.

—The Cocassett tannery at Benicia, Cal., tan 30,000 hides annually, producing about 1,060,000 pounds annually.

—The Giant Powder Co.s' Black powder works at Clipper Gap are temporarily closed down while a new pipe line is being put in.

—The California Magnesite Co., 65 Union street, San Francisco, are successfully producing carbonic acid gas and other magnesia products.

—Coal has been discovered in Riche canyon, near Redlands, San Bernardino county. The bed developed by a 125-foot shaft is 20 inches in thickness.

—Japan is sending 2000 laborers to the Brazil coffee plantations on a five years' contract. The coolies will each receive $7.50 per month and everything found.

—The railroad over the isthmus of Tehuantepec in Mexico is finally completed and open for business. Fifty-five years have elapsed since the enterprise was initiated.

—The Palermo Land and Water Co. is building a new head dam for their ditch in the south fork of the Feather river. It is to be a crib dam, faced with rock and laid in cement. The cost of the work, it is estimated, will be between $5000 and $6000.

—The newly organized corporation, the Sacramento Electric, Gas and Railway Co., has absorbed the Folsom Water Power Co. and the Sacramento Electric Power and Light Co. There is no change in the controling management. They propose to manufacture acetylene with a portion of their electric power at Folsom.

—The Pacific Coast Hardware and Metal Association is made up of representative firms, not to raise prices, but to facilitate the general transaction of business. The association is officered as follows: President, B. F. Dunham of Dunham, Carrigan & Hayden, this city; first vice-president, Wm. Honeyman of Honeyman, De Hart & Co., Portland; second vice-president, C. C. Reynolds of the Harper-Reynolds Co., Los Angeles; third vice-president, Wm. Schaw of Schaw, Ingram & Batcher Co., Sacramento; treasurer, J. F. Merrill of Holbrook, Merrill & Stetson; secretary, Frank L. Brown of the Washburn-Moen Co., this city; executive committee, W. R. Wheeler of Holbrook, Merrill & Stetson; A. A. Watkins of W. W. Montague & Co.; Wakefield Baker of Baker & Hamilton; H. J. Morton of George W. Gibbs & Co.; A. L. Scott of Miller, Sloss & Scott, and the president and vice-presidents. The association will meet in Los Angeles next December, and in Portland, Or., next year.

—The San Francisco assessor furnishes statistics that give an epitome of San Francisco's manufactures. In the following is given the name of the product, number of concerns manufacturing it, number of male help employed and value of production for last year:

Agricultural implements, 1; men, 25; products, $40,000. Air compressors, 2; men, 25; products, $50,000. Aluminum, 2; men, 10; products, $50,000. Artificial stone, 23; men, 240; products, $350,000. Architectural iron, 7; men, 70; products, $125,000. Axle grease, 4; men, 30; products, $100,000.

Bags, jute and hemp, 3; men and boys, 160; products, $590,000. Barrels, 20; men and boys, 300; products, $500,000. Barbed wire and wire nails, 1; men and boys, 50; products, $75,000. Bedding and upholstering, 14; men, 150; products, $300,000. Bed springs, 2; men, 15; products, $65,000. Bellows, 2; men, 5; products, $12,000. Belting, 4; men and boys, 47; products, $175,000. Billiard tables, 2; men and boys, 6; products, $250,000. Boat builders, 11; men, 40; products, $25,000. Bookbinders, 17; men, boys and girls, 255; products, $250,000. Boots, shoes and slippers, $17; men, women and boys, 500; Chinese, 150; products, $1,200,000. Brass foundries, 5; men and boys, 100; products, $220,000. Boxes (cigars), 4; men and boys (white), 40; products, $40,000. Chinese, 100; products, $30,000. Boxes (paper), 4; men and boys, 100; products, $100,000. Boxes (wooden), 8; men and boys, 300; products, $450,000. Breweries, 29; men, 750; hops consumed, 500,000 pounds; barley consumed, 20,000 tons; beer manufactured, 500,000 barrels; products, $1 700,000. Brooms, 5; men and boys, 100; products, $125,000. Brushes, 11; men and boys, 90; products, $75,000.

Candles, 2; men and boys, 30; products, $75,000. Carriages and wagons, 47; men and boys, 300; products, $100,000. Coffee, spices and chocolate, 24; men, boys and girls, 400; products, $1,750,000. Confectionery, 26; men, boys and girls, 300; products, $650,000. Cider, 4; men, 11; products, $10,000; Cigars, 302; men, women and boys, 250; Chinese, 500; cigars manufactured, 60,863,000; cigarettes manufactured, 2,827,000; products, $1,800,000. Cracker bakeries, 3; men and boys, 160; products, $650,000 Cars, 2; men, 100; products, $150,000. Chemical works, 9; men, 30; products, $150,000. Clothing, 28; men, women and boys, 300; Chinese, 900; products, $1,750,000. Coppersmiths, 3; men and boys, 40; products, $100,000. Cordage and rope, 1; men and boys, 250; product, $650,000. Cloaks, 34; women, 350; products, $150,000. Coffins, 2; men and boys, 50; products, $100,000. Cutlery, 4; men, 30; products, $30,000.

Dry docks, floating, 2; men employed, 60; capacity of dock No. 1, 4500 tons; capacity of dock No. 2, 2000. Dry dock, stone, 1; length of excavation in rock, 490 feet; width at top, 120 feet; width at entrance, 90 feet; capacity of length, 425 feet; capacity of drawing, 22 feet; capacity of pumps per hour, 326,316 feet; total cost of work, $675,000.

Electric machine works, 3; men, 100; product, $80,000. Electric light companies, 2; men and boys, 255; number of incandescent, 77,500; number of arc, 3300; coal used, 26,400 tons; product, $719,000. Electric supplies, 15; men, 100; manufactures, $200,000. Elevators, 2; men and boys, 35; manufactures, $60,000.

Fertilizers, 4; men and boys, 50; product, $100,000. Fireworks, 1; men and boys, 10; manufactures, $20,000. Flour and feed, 7; men and boys, 200; manufactures, $850,000 Foundries and machine works, 40; men and boys, 2000; product $2,000,000 Fringe, 4; men and women, 150; manufactures, $2,0000. Fruit canning and preserving, 9; men, women and boys, 1240; value of vegetables, fruits and meats, $2,000,000. Furniture, 20; men and boys, 200; manufactures, $260,000. Fur, 6; men and women, 150; manufactures, $200,000.

Gas works, 3; men, 500; product, $1,750,000. Gas engines, 8; men, 80, manufactures, $75,000. Glass, 1; men and boys, 150; manufactures, $200,000; glass cutting and bending, 4; men and boys, 50; manufactures, $250,000. Gloves, 12; men, women and boys 500; manufactures, $600,000. Glue, 1; men and boys, 8; product, $40,000. Glycerine, 1; men, 14, product, $15,000.

Harness, 30; men and boys, 200; manufactures, $350,000. Hats and caps, 8; men and women, 100; manufactures $350,000. Ice, 3; men, 35; product, $1,000,000. Ink and mucilage, 1; men, 8; manufacturers, $15,000. Iron fence, 4; men and boys, 20; manufactures, $25,000.

Japanning and galvanizing, 3; men and boys, 50; product, $125,000. Jewelry, 15; men, 125; manufactures, $500,000.

Laundries, white labor 119, Chinese 174, total, 293; men, women and boys, 1300; Chinese employed, 1000. Lasts, 3; men 25; manufactures, $20,000. Lead pipe and shot, 1; men, 50; manufactures, $500,000. Linseed oil, 1; men, 60; product, $200,000.

Macaroni and vermicelli, 12; men and boys, 125; product, $150,000. Malt, 4; men, 50; product, $600,000. Marble, 20; men and boys, 80; product, $150,000. Matches, 3; men and boys, 60; manufactures, $35,000. Millinery, 109; women, 600; product, $400,000. Mirrors, 1; men, 15; manufactures, $20,000. Musical instruments, 10; men and boys, 60; manufactures, $70,000.

Neatsfoot oil, 1; men, 5; product, $5000.

Oakum, 1; men, 20; product, $15,000.

Paint, 6, men, 50; manufactures, $400,000. Picture frames, 10; men and boys, 100; manufactures, $100,000. Pumps and pumping machinery, 7; men, 50; manufactures, $175,000. Provision packing-houses, 3; men, 350; product, $1,500,000.

Quartz mill machinery, 5; men, 300; manufactures, $300,000. [illegible] Rolling mills, 1; men, 350; manufactures, $600,000. Rubber, 3; men, 35; manufactures, $450,000. Rubber stamp, 7; men and boys, 35; manufactures, $40,000.

Safe and vault works, 4; men and boys, 20; manufactures, $50,000. Saw and planing mills, 10; men and boys, 200; manufactures. $300,000. Shirts, 38; men, women and boys, 1200; manufactures, $700,000. Saws, 3; men, 60; manufactures, $135,000. Sash, door and blinds, 12; men and boys, 300; manufactures, $400,000. Ship yards, 6; men, 800; product, $1,500,000. Silverware, 4; men, 30; manufactures, $200,000. Salt works, 6; men and boys, 50; product, $100,000. Soap, 10; men, 75; soap made annually, 9,000,000 pounds; product, $300,000. Soda water, 7; men, 60; product, $80,000. Solder and babbitt, 3; men, 30; manufactures, $75,000. Showcases, 4; men, 15; manufactures, $15,000. Sugar refinery, 1; men and boys, 900; raw sugar used, 282,876,805 pounds; white sugar made, 235,399,133 pounds; yellow sugar made, 13,747,508 pounds; syrup made, 472,090½ gallons; value, $9,405,321.31. Syrup and cordial, 4; men, 30; manufactures, $30,000.

Tanneries (hides), 20; men, 200; manufacturers, $1,000,000. Tanneries (sheep skins), 4; men, 100; manufactures, $175,000. Tinware and tin cans, 8; men and boys, 1000; manufacturers, $1,000,000. Trunks, 2; men and boys, 45; manufactures. $100,000. Type foundries, 4; men, 100; manufactures, $50,000. Tanks, 2; men, 25; product, $30,000.

Varnish, 5; men, 8; manufacturers, $50,000. Veneering, 1; men 30; product, $50,000. Vinegar and pickles, 9; men and boys, 90; manufacturers, $125,000.

White lead, 2; men, 50; product, $250,000 Windmills, 3; men, 20; manufactures, $120,000. Wire and wire rope, 1; men, 100; manufacturers, $375,000. Willow and woodenware, 2; men, 25; manufacturers, $50,000. Woolen mills, 1; men, women and boys, 100; manufacturers, $200,000. Whips, 1; men and women, 6; manufacturers, $15,000. Wood turning and carving, 7; men and women, 125; product, $1,000,000. Water wheels, 1; men, 50; manufacturers, $250,000. Women and children's underwear, 11; women, 150; product, $125,000. Wool scouring and grading, 3; men and women, 300; wool produced, 35,856,690 pounds; wool scoured, 18,000,000 pounds; value of product, $2,868,560.

Commercial Paragraphs.

THE J. H. Montgomery Machinery Co., successors to the Whim Co., of Denver, Col., has issued a book of short rules and useful information and catalogue of common sense mining machinery, which is now ready for distribution, and will be sent free to any address on application.

THE good will of the machinery house of H. P. Gregory & Co. has been bought by the new firm of Henshaw, Bulkley & Belcher, who will in future conduct the business.

THE Washburn-Moen Manufacturing Co., 8 Pine St., this city, this week filled an order from the Tiger-Poorman, Burke, Idaho, for 1500 feet ⅛x5½-inch wire rope, and four flat ropes for the Pearl del Monte Co., Pachuca, Mexico. The latter is made of specially prepared plow-steel wire, with a tensile strength of 275,000 pounds to the square inch.

THE Colorado Iron Works Company of Denver, Col., has just completed arrangements with Mr. C. T. Finlayson of Denver whereby they secure the exclusive right to manufacture and sell the Finlayson patent wire-rope tramway. This tramway is of the double-rope type, having a standing or still rope, which the buckets carriers run, and a traction or tail rope, which regulates the speed of buckets and to which they are attached. One feature of this system is the automatic device for attaching and detaching the buckets to the tail rope. This arrangement, while very simple, has been long sought for among builders and users of the double-rope tramway systems and until now has never been brought out. Another feature is the carriage at each terminal for gradually starting the buckets which are at rest, avoiding the jar to rope and doing away with labor of shoving buckets to give them momentum of rope. Another very important feature is the automatic loading and dumping devices. This is built for light or heavy tonnage. Anyone contemplating the erection of a tramway cannot afford to purchase without first investigating the merits of the Finlayson patent wire-rope tramway. The Colorado Iron Works Company will be pleased to furnish literature and any information desired.

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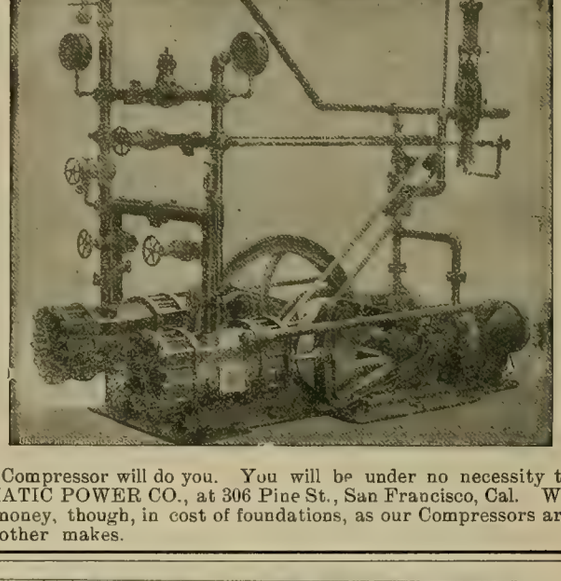

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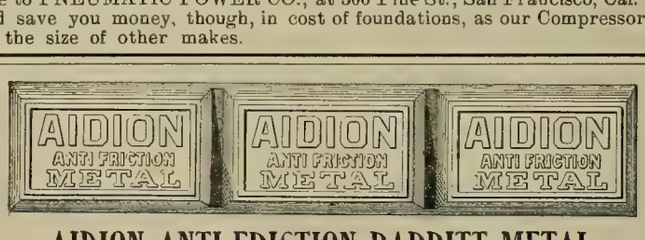

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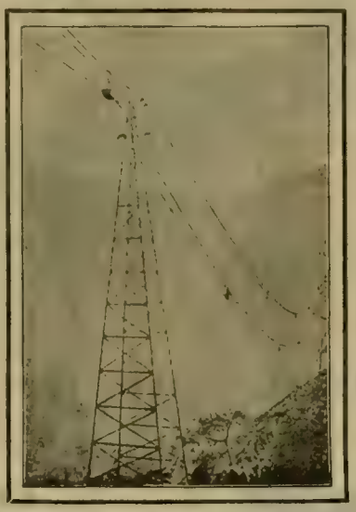

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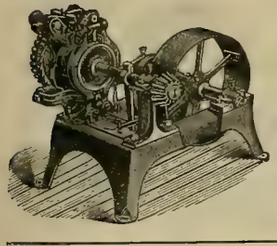

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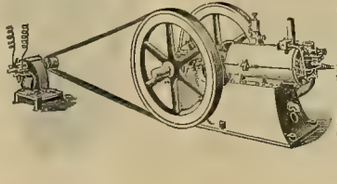

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific ast.

FOR THE WEEK ENDING JUNE 30, 1896.

563,119 — AMALGAMATOR — F. B. Austin, Tempe, A. T.
563,216 — KEY FASTENER — J. A. Beebe, Tacoma, Wash.
563,007—PUMP—H. C. Behr, S. F.
562,794—BOTTLE—A. D. Boardman, Sumner, Wash.
563,128—CAR UNLOADER—P. E. Boyce, Snohomish, Wash.
563,132—STOPPER—E. L. Brown, S. F.
563,012—PEPPER AND SALT BOX—J. C. Campbell, Spokane, Wash.
563,022—FREIGHT CAR—G. B. Davis, Sierra Madra, Cal.
562,951—FLUSHING BOWLS, ETC.—E. Douglas, S. F.
563,028—COOKING STOVE—W. C. Eymann, Anaheim, Cal.
562,895—WATER TOWER—D. D. Hayes, Oakland, Cal.
562,963—DREDGER SLEEVE—A. L. Horner, Seattle, Wash.
563,181—ORE CRUSHER—E. P. Jones, S. F.
563,244—TROLLEY SYSTEM—W. C. Keithly, S. F.
562,901—DESK HINGE—H. M. Lambert, Portland, Or.
563,046—GOLD SEPARATOR—J. Mait, Oakland, Cal.
563,069—SOLDERING MACHINE—H. Schaake, S. F.
562,936—THILL COUPLING—O. Taber, S. F.
563,104—ANVILS—C. E. Van Coughnet, Fort Bidwell, Cal.
25,728—BED PAN DESIGN—W. M. Searby, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

APPARATUS FOR SEPARATING AND SAVING GOLD.—Joseph Mait, Oakland, Cal. No. 563,046. Dated June 30, 1896. This invention relates to an apparatus which is especially designed for separating gold from the lighter worthless particles and gangue, and arresting and obtaining the gold while allowing the waste particles to pass away. It consists essentially of an inclined table having peculiarly shaped grooves or channels made transversely in it at intervals, stationary spoons or stirrers supported from above the table, so that the blades dip transversely into the depressions and supports upon which the table is carried, with mechanism by which it is given an oscillating motion from side to side, and at the same time a tossing or bumping vertical motion, so that the pulp, sand, or gravel flowing down over the table is spread and agitated, and as it passes into the depressions in the table the movement of the table produces a constant agitation of the pulp, sand or gravel and an eventual settling of the gold and heavy metal and sulphurets to the bottom and into a supplemental retaining channel.

PUMP OPERATING MECHANISM.—Hans C. Behr, San Francisco, Cal. No. 563,007. Dated June 30, 1896. This invention relates to that class of pumping machinery wherein a double-acting reciprocating pump or a single-acting pump counterbalanced so as to equalize or distribute the work over the two strokes, is operated from a crank and suitable driving connections, usually toothed gears and a motor. The object of the invention is, first, to prevent acceleration in speed at the dead points of the pump stroke without the use of excessive weights, previously suggested for similar purposes; and, second, to enable adjustments which will cause, if desired, even a decrease in speed at the dead-points, for the purpose of obtaining more quiet action of the pump valves, thereby permitting a greater number of strokes per minute of the pump than could otherwise be practicable, and thus, also, increasing the capacity of the pump. The improvements consist in a proportion of toothed gears, such as have been suggested in connection with a weight, tending alternately to accelerate and retard the motion of the smaller gear, which said smaller gear I connect with a cylinder having a piston subjected continuously on one face to the pressure of compressed air or other gas or vapor, so as to act in the same manner as a weight, but without the drawback of the excessive mass; also, in means for varying the angle of the crank on which the piston acts, in order to enable adjustment of period of maximum effect on piston in relation to period of maximum pump resistance, the object of this being to compensate for the effect of the reciprocating masses of the pump and parts moving coincidently with it, which effect is different at different speeds and requires adjustment to suit the latter.

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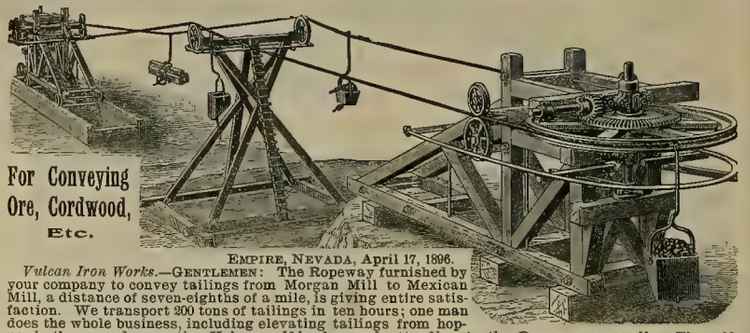

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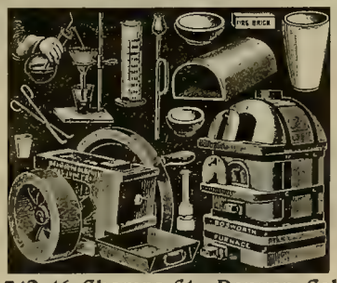

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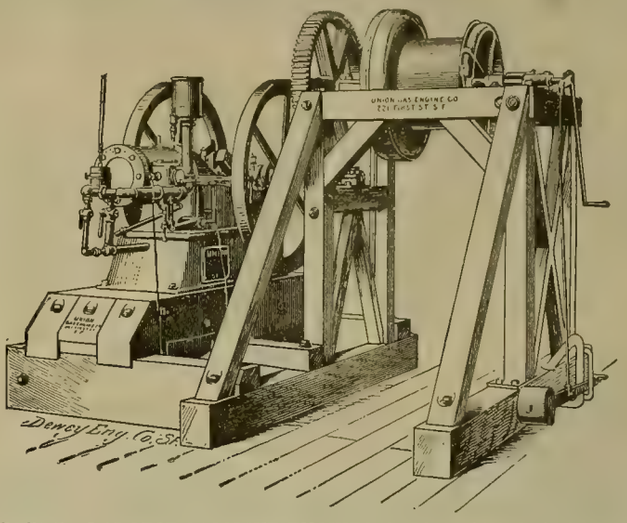

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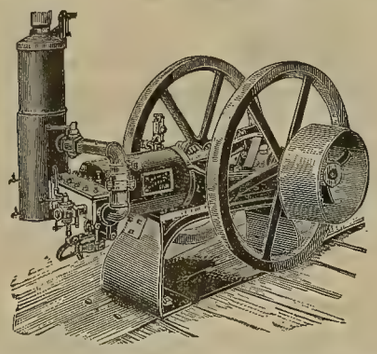

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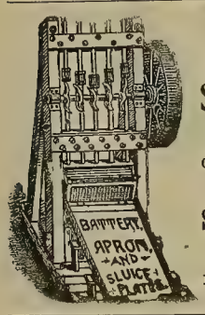

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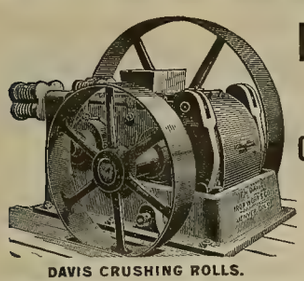

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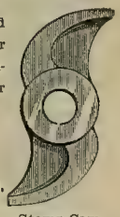

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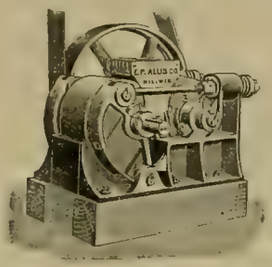

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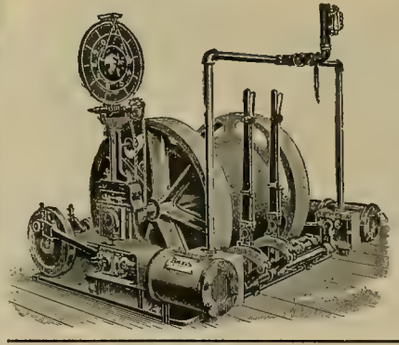

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FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, ae Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

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Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class agency. We have able and trustworthy associates and agents in Washington and the capital cities of the principal nations of the world. In connection with our scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us to give advice which will have inventors the expense of applying for patents upon inventions which are not new. Circulars and advice sent free on receipt of postage. Address **DEWEY & CO., Patent Agents, 220 Market St., S. F.**

Market Reports.

The Markets.

SAN FRANCISCO, July 9, 1896.

Business shows quite an increase in volume compared with the corresponding time last year. While there is more or less croaking about the "silver agitation," yet it must be conceded that business men in general are more confident regarding the future and express themselves as firm believers in the proposition that general trade and finance would soon regulate themselves to any change that might be made in the monetary system of the country. The continued growing activity in the gold mining industry has no little to do with the better feeling in this State. This is further strengthened by seemingly well authenticated reports that one of the best known mining men in Europe will be here in the interest of Europeans and Americans to report on the Mother Lode in this State. Among manufacturers there is a continued good feeling with the outlook favorable for a continuance of orders for structural, mining machinery and other purposes.

The local money market is easy with a continued light call in view of heavy disbursements for interest, dividends, etc. These will aggregate over $2,000,000. At New York the July disbursements will aggregate over $90,000,000, while at other money centers there will be large disbursements. It is reported at the East that some hoarding of gold is going on. This is being done chiefly by Americans. Notwithstanding this, there appears to be an increasing belief that the worst has been seen in general business and there will be a steady improvement.

New York Silver Prices.

NEW YORK, July 9.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	31 7-16	68¾
Saturday*		
Monday	31 7-16	68¾
Tuesday	31½	68⅞
Wednesday	31½	68⅞
Thursday	31½	68⅞

	Copper.	Lead.	Iron.	Tin.
Friday	11 50	3 00	11 00@12 00	13 60
Saturday*				
Monday	11 50	3 00	11 00@12 50	13 60
Tuesday	11 50	2 97½	11 00@12 50	13 55
Wednesday	11 50	2 97½	11 00@12 50	13 55

*Holiday.

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	7½
New York Telegraphic Transfer	10
London Bankers' 60 days	$4.88
London Merchants	$4.86
London Sight Bankers	$4.89½
Refined Silver, per oz., 1000 fine	68⅞
Mexican Dollars	54@55c

In view of the prominence which will be given to silver during the political campaign the following table showing the exports of that metal from London to India, China and the Straits for a series of years, is interesting:

	India.	China.	Straits.
1886	£4,348,010	£363,593	£594,280
1887	4,068,289	293,266	368,570
1888	4,348,529	349,121	661,627
1889	5,834,334	355,874	1,681,114
1890	7,330,856	263,947	912,606
1891	4,462,754	241,985	2,209,966
1892	7,229,199	147,882	3,826,739
1893	7,052,271	2,390,969	1,612,513
1894	5,012,693	2,728,771	1,233,446
1895	3,824,496	1,652,523	753,883
1896 to date	1,771,798	492,860	500,532
Corresponding period last year	1,943,380	1,100,767	335,035

A careful study of the above would indicate that there is some hoarding going on either in this country or Europe or probably both. If this supposition is correct then the buyers must have confidence in the future.

SILVER.—The market has strengthened slightly, notwithstanding exporters say that our markets are too high for shipment. Referring to the situation at the East, a New York exchange says: "The small exports of silver the last ten days are due mostly to the fact that the price of silver has been ruling higher here than in London, and yet not high enough to enable dealers to buy in the London market and sell here for import. The shutting down of some of the Western silver mines, owing to the strikes, it is thought may tend to keep the price here higher than in London for a time longer, because it is said the supply on the London market is large enough for present needs. One dealer says, however, that all this may change any day now, because some of the foreign Governments may undertake to fill their monthly orders as early in July as possible. These Governments buy a certain amount of silver each month."

MEXICAN DOLLARS.—The market is quiet at from 54 to 55 cents, according to quality and quanity.

COPPER.—The market has held fairly steady both at home and abroad. Our New York advices indicate that any large sized selling order could not be put through at over 11½ cents, but notwithstanding this the aggregate of expert movements foots up quite well for this season of the year. Referring to the New York market the *Journal of Commerce* of that city says; "The most prominent feature this week has been more or less free selling of Lake Superior ingot from second hands at prices a good fraction below those quoted by representatives of prominent mining companies. To all accounts 750,000 pounds or more were disposed of at 11½c. Whether additional purchases can be made at that rate is not clear, but there is hardly a doubt that 11¾ would be accepted in almost any quarter. Electrolytic has been moving very fairly, mostly at about 11⅜@11½c, as to quantity, and some business in casting stock went through at 10¾@11c. In the London market speculation has been on a smaller scale and prices for merchant bars have fluctuated within the narrow range of £49 a £49 7s 6d. European consumption, however, is still reported as being very heavy."

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The market is steady with a fair export demand.

The market is quoted as follows:

Home trade, per flask	37 00
Distant points up north	36 25@37 00
West coast of Mexico, for export	32 50

ANTIMONY.—The demand is slow, with the market easy at 7⅞@8¼c in a jobbing way. New York mail advices quote 7⅞@7½c for Cookson's, 6⅝c for Hallett's and 6½c for Japanese, from store.

LARD.—The market is quiet with buyers trying to secure concessions. The increased output of Mexico is said to be a disturbing factor. New York mail advices are to the effect that the market is easy, with only a moderate call for both home and export.

Pig	3 75	@	4 00
Bar	—	@	4 15
Sheet	—	@	5 50
Pipe	—	@	4 75

SHOT.—The market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—The market is strong, in sympathy with the East and Europe. An expected improvement in silver has something to do with it. A New York exchange of July 3 reports: "Prices have steadily hardened the past week, in the face of heavy shipments last month from primary sources of supply and an increase in the total amount of tin on spot and afloat for Europe and America. In the London market there was a rise from £60 17s 6d to £61 7s 6d for prompt delivery, and futures commanded about 10s premium. Spot delivery, actual tin, sold at from 13.50c up to 13.60@13.65c f. o. b. in good-sized lots, and at the usual advance in a jobbing way. Exchange contracts for spot delivery also ranged higher, reaching 13.55c near the close of the week, but futures from August forward were at about 10c per 100 lbs discount and considerably below the cost to import."

The market is quoted as follows:

Pig, per lb	14½c
Plate, I C coke, heavy, per box	$4 25
" " " light, "	4 10

BORAX.—The market is quoted as follows

Refined, in car lots	6¼
Refined, in sacks	6¾
Powdered, in car lots	6¼
Concentrated, "	5¾

POWDER.—There is a growing conviction that the rivalry or competition in this market will stop before long, which, when an accomplished fact, will bring about better prices.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, "	8½c

COAL.—The market is fairly steady for spot, to arrive and shipment.

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 00	@	10 00
" spot, in bulk	— —	@	11 00
" in sacks	— —	@	12 00
Cumberland	— —	@	— —

LUMBER.—There is a fair home and export demand.

The market is quoted in this city from dock or yards as follows:

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—Jobbers report a fair demand at quotations.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 22½
" jobbing, " "	3 35
Cut, carloads, " "	2 97½
" jobbing, " "	3 10

Mining Share Market.

SAN FRANCISCO, July 9, 1896.

Contrary to general expectation the market rallied slightly just before the holidays, with Chollar the leader. When business was resumed yesterday there were higher prices along the entire line. The advance was due to confirmed reports that on Monday they passed through a vein of ore about 2 feet wide assaying $45 a ton while running the Chollar south drift on the 300-foot level, Brunswick lode. This find had not, so far as we are advised, been looked for and coming unexpectedly has raised the hopes of mining men that the 300-foot level is liable to prove more fertile and show considerable of an improvement over the 200-foot level. The writer holds to the opinion that the ore found on the 200-foot level will not only be struck on the 300-foot level but still lower down. This opinion is based on the fact that in Occidental the downward continuation of the ore has been found on the 750-foot level with everything pointing to it's continuing still lower. The buying at yesterday's advance seems to have been largely by moneyed men—those having faith in the Brunswick lode proposition—and after having secured all they could, through cross orders and similar means, the market was sent down so as to get in all the shares possible on the decline. While the work is underway on the Brunswick lode the shares of the mines will be a gamble. If expectations should be realized there can be no doubt but they ought to sell higher on a legitimate business proposition, yet to frighten holders those manipulating the market may make fluctuations of such a nature as to make it dangerous for margin buyers. Outside of the Brunswick lode proposition, the work going on in the mines on the Comstock lode deserves close watching, for in several it is of quite an interesting character.

The following companies had cash on hand on July 1st, according to the financial statements now on file: Andes, $7640.59; Alpha Con., $3016.13; Alta, $8233.84; Best & Belcher, $667.47; Belcher, $2663.02; Bullion, $5393.38; Bulwer Con., $6469.26; Bodie Con., $1150.73; Confidence, $1736.66; Challenge, Con. $1409.53; Con Imperial, $974.03; Caledonia, $4573.65; Con. California & Virginia, $25,769.32 in coin and $34,000, the assessed value of unsold bullion, with the expenses of the past month unpaid; Con. New York, $2247.64; Chollar, $2544.97; Crown Point, $10,118.34; Exchequer, $2353.40; East Sierra Nevada, 47c; Hale & Norcross, overdraft $1483.26 and due bank $3000; Julia Con., $519.34; Lady Washington, $259.22; Mexican, $15,407.15; Mono, $229.68; Ophir, $8559.15; Occidental Con., $13.57, with $4000 due on note at the bank and an assessment in process of collection; Overman, $10,351.70; Scorpion, $1513.98; Silver King, $435.66; Standard Con., $3629.99; Potosi, $14,486.32; Savage, $12,211.77; Silver Hill, $1587.95; Seg. Belcher, $5281.17; Syndicate, $621.37; Union Con., $7584; Gould & Curry, $8144.92; Utah, $2894.

During the holidays a number of San Franciscoans visited Virginia City, including Max Goldman of the Pacific Stock Exchange. They all express themselves highly pleased with what they saw and heard. Mr. Goldman is decidedly bullish on the mines, particularly those on the Brunswick lode. He evidently thinks that all has not been told in their favor. His opinion is shared by the others.

From mines on the Comstock lode our advices are slightly more favorable from Alta, but it points to more time, even after procuring proper connections for ventilation. In the Gold Hill mines no work, so far as the public knows, is being done in Caledonia, Kentuck and Exchequer. In Seg. Belcher and Belcher needed repairs are being done. The bullion return from the ore milled by the former was over $3,100 and of the latter over $7,400. This will help to keep off assessments for a while, at any rate. In Crown Point connection has been made between the 600-foot and 700-foot levels. This admits of work to the west below the former level and extracting gold ore going around $12 a ton. The latter will more than pay expenses. On the 600-foot level a west crossdrift is being run. We are not advised as to work, if any, that is being done in Yellow Jacket. After the annual election this will probably be changed. In Confidence they are still raising for surface ventilation connection. After this has been secured, that mine and also Challenge can be worked on the 200-foot level to a much better advantage. The west crossdrift being run in Con. Imperial ground jointly by Confidence, Challenge and Con. Imperial is in over 500 feet.

The west lode must have dipped to the west or it would have been struck before this. In Alpha they are at work on the 500-foot level, to the west. In Bullion they are still running the long west crossdrift. In Potosi they are at work on the 450-foot level. No ore is reported. In Chollar they are raising over 100 tons of ore a week. It assays over $20 a ton. Advices from Hale & Norcross report a slight improvement on the 700-foot level in the crossdrift that is being run for the ore found in Savage. From the other parts of the mine nothing new is reported. The ore that is being raised is less in quantity and value. In Savage the ore on which they had been raising is of poorer grade, but now work has been started which ought to result well. They raised only about 80 tons the past week. The assays are lower. Work is continued by Best & Belcher and Gould & Curry in the joint east crossdrift from the Bonner shaft. Work is continued in Con. Virginia in the different levels heretofore reported. They raised about 90 tons of ore which assayed about $69 a ton. Superintendent Lyman is engaged in extinguishing the smouldering fires in the old bonanza space. Two of the directors of the company visited the mine and were well pleased with what he is doing and believe that it is the only way to prevent trouble in the future. They found that a regular system of pipe laying had been done to where the fire and gas trouble comes from, for the purpose of letting water slowly run in so as to thoroughly soak the earth and timber that have been used to fill up the apace. By doing this fires by friction will be impossible. Past experience has proven that it is impossible to reach the desired points with carbolic acid gas so as to extinguish the fires and free the mine from the other poisonous gas. Mining men affirm that the plan adopted by Superintendent Lyman is the only practicable one to put the mine in good condition again. Advices from Ophir, Mexican, Union, Sierra Nevada, Utah and Andes, is that work is on the same levels and in the same direction as heretofore reported by us. That in two of the mines is being closely watched by mining men.

Interest continues to be centered on the work that is being done on the Brunswick lode. In the ground owned by Chollar, Hale & Norcross, Savage and Gould & Curry, active work is under way, and any day strikes of ore are liable to take place. The work already done proves beyond a doubt that the lode is fertile and that quite a body of ore may be run into. In continuing the south drift by Chollar on the 300-foot level, a vein of ore about two feet wide was struck about six feet from the Hale & Norcross south line. This ore assayed $40 a ton, and as it had not been expected the hopes of mining men have been correspondingly raised. It was not expected that anything would be found until the drift had been extended from 40 to 50 f et in the Chollar ground. At this distance it is expected that the downward continuation of the ore found above would be run into. This new find on the 300-foot level is thought to be entirely separate and distinct from anything found on the 200-foot level. In Occidental there are reports current of an improvement. The official letter is quite encouraging and causes mining men to believe that good things san be looked for in the near future.

The following illustrates the changes of the week:

Mines.	July 2.	July 9.
Alpha	$ 10	$ 13
Alta Consolidated	10	10
Andes	32	32
Belcher	49	50
Best & Belcher	75	77
Bodie	40	40
Bullion	18	21
Challenge	35	.....
Chollar	2 20	2 50
Confidence	99	.....
Consolidated California and Virginia	1 90	1 90
Consolidated New York	.....	.....
Crown Point	52	53
Exchequer	05	.....
Gould & Curry	98	96
Hale & Norcross	1 25	1 85
Justice	05	.....
Mexican	66	65
Ophir	1 15	1 15
Overman	.....	19
Potosi	1 05	1 20
Savage	88	86
Sierra Nevada	55	.....
Union	53	51
Utah	00	12
Yellow Jacket	45	43

San Francisco Stock Board Sales.

SAN FRANCISCO, July 9, 1896

9:30 A. M. SESSION.

200 Alta	10	200 Gould & Curry	90
650 Andes	32	200	91
700 Belcher	50	400 Mexican	65
100 Bodie	40	500 Mono	16
1100 Bullion	20	550 Occidental	1 00
100	21	100 Ophir	1 10
500 Caledonia	15	400 Overman	19
400 Chollar	2 35	700 Potosi	1 10
200	2 40	100	1 05
500 Con Imperial	52	200 Savage	84
400	53	100	82
400 Crown Point	52	100 Union	50
400	53	600 Yellow Jacket	43
300 H. & N	1	20	

SECOND SESSION—2:30 P. M.

150 Ophir	1 15	100 H. & N	1 85
150 Gould & Curry	96	800	1 80
100 Best & Belcher	77	400 Crown Point	53
100 Con Cal & Va	1 90	500 Alpha	13
100 Savage	86	200 Utah	12
100 Chollar	2 45	100 S. B. & M	14
50	2 50	200	15
300	2 40	100 Union	51
700 Potosi	1 20	200 Occidental	1 05

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Best & Belcher M Co, Nev	60	25c	July 2	Aug 6..Aug 27	M Jaffe, 309 Montgomery
Bullion Con G M Co, Cal	8	15c	June 16	July 20..Aug 11	C A Grow, Mills Building
Central Eureka M Co, Cal	1	3c	May 16	June 22..July 18	W Van Bokkelen, 320 Sansome
Channel Bend M Co, Cal	3	5c	June 23	July 31..Aug 22	J P Langhorne, 39 Sutter
Chollar M Co, Nev	42	25c	June 9	July 14..Aug 4	C E Elliot, 309 Montgomery
Horseshoe Bar Con M Co, Cal	4	50c	May 12	June 22..July 14	D M Kent, 330 Pine
Jamison M Co, Cal	8	5c	July 6	Aug 15..Aug 31	Sam W Cheyney, 120 Sutter
Kentuck Con, Nev	12	5c	June 16	July 22..Aug 12	Aug Waterman, 309 Montgomery
Marguerite G M & M Co, Cal	3	10c	June 18	July 28..Aug 28	Chas. Winters, 237 Twelfth
Mono G M Co, Cal	37	10c	June 2	July 6..July 27	M E Willis, 309 Montgomery
Mt Diablo M & M Co, Nev	4	5c	May 21	July 2..July 23	R W Heath, 318 Pine
Nimshew G M Co, Cal	1	3c	June 5	July 13..Aug 3	C D Cook, Mission St Pier No. 1
Occidental Con M Co, Nev	23	15c	June 2	July 7..July 28	A K Durbrow, 309 Montgomery
Old Flag M Co, Cal	3	2c	May 11	June 18..July 6	F L Olmsted, 315 Montgomery
Reward G M Co, Cal	13	3c	June 1	July 2..July 20	S W Backus, Mills Bldg
Silver King M Co, Arizona	14	25c	May 7	June 16..July 14	J W Pew, 310 Pine
Ybarra G M Co, Mexico	4	15c	May 21	June 21..July 9	Jas Coffin, 132 Market

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Best & Belcher M Co, Nev	M Jaffe, 309 Montgomery	July 13
Savage M Co, Nev	E D Holmes, 309 Montgomery	July 16

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Assessment Notices.

NIMSHEW GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Nimshew, Butte county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 5th day of June, 1896, an assessment (No. 1) of Three cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Mission Pier, No. 1, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of July, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 3d day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

C. D. COOK, Secretary.

Office, Mission St. Pier, No. 1, San Francisco, California.

MARGUERITE GOLD MINING AND MILL CO. Location of principal place of business, San Francisco, California; location of works, Auburn, Placer county, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 18th day of June, 1896, an assessment (No. 3) of Ten Cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 237 12th St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of July, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on FRIDAY, the 28th day of August, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

Office — 237 12th St., San Francisco, California. Office hours from 4 to 6 P. M.

BEST AND BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of July, 1896, an assessment (No. 69) of twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 33, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of August, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 27th day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room No. 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Little Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 8) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 31st day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

ANNUAL MEETING—The Regular Annual Meeting of the stockholders of the Savage Mining Company will be held at the office of the Company, Room 50, Nevada Block, No. 309 Montgomery street, San Francisco California, on THURSDAY, the sixteenth day of July, 1896, at the hour of one o'clock p. m., for the purpose of electing a Board of Trustees to serve for the ensuing year, and the transaction of such other business as may come before the meeting.

Transfer Books will close on Monday, July thirteenth, at 3 o'clock p. m.

E. D. HOLMES, Secretary.

Office—Room 50, Nevada Block, No. 309 Montgomery street San Francisco, Cal.

ANNUAL MEETING—The regular Annul Meeting of the stockholders of the Best & Belcher Mining Company will be held at the office of the Company room 33, Nevada block, No. 309 Montgomery street, San Francisco, California, on Monday, the thirteenth (13th) day of July, 1896, at the hour of 1 o'clock p. m., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting Transfer books will close on Thursday, July 9th, at 3 o'clock p. m.

M. JAFFE, Secretary.

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DIVIDEND NOTICE.

The German Savings and Loan Society,

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For the half year ending June 30, 1896, a dividend has been declared at the rate of four and twenty-six hundredths (4.26) per cent per annum on Term deposits, and three and fifty-five hundredths (3.55) per cent per annum on Ordinary deposits, free of taxes, payable on and after Wednesday, July 1 1896. GEO. TOURNY, Secretary.

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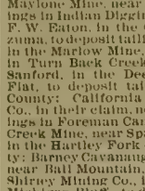
THE CALIFORNIA DEBRIS COMMISSION having received applications from the following persons to mine by the hydraulic process, viz.: In El Dorado County: John J. Flora, in the Buckeye Hill Mine, near Volcanoville, to deposit tailings in Buckeye Canyon; Giacomo Varozza, in the Try Again Mine near Placerville, to deposit tailings in a ravine below the mine; Giovanni Raffetto, in the Raffetto Mine, near Placerville, to deposit tailings in South Weber Creek; J. R. Vandergrift, in the Maylone Mine, near Indian Diggings, to deposit tailings in Indian Diggings Creek. In Tuolumne County: F. W. Eaton, in the Cook Gravel Mine, near Montezuma, to deposit tailings in State Gulch. A. P. Scheid, in the Marlow Mine, near Sonora, to deposit tailings in Turn Back Creek. In Nevada County: Eber A. Sanford, in the Deer Creek Mine, near Mooney's Flat, to deposit tailings in an old pit. In Plumas County: California Gold Mining and Investment Co., in their claim, near Taylorville, to deposit tailings in Foreman Canyon; Henry W. Orr, in the Slate Creek Mine, near Spanish Ranch, to deposit tailings in the Hartley Fork of Slate Creek. In Placer County: Barney Cavanaugh, in the Parke and Brown Mine near Ball Mountain, to deposit tailings in a ravine; Shirey Mining Co., in the Shirley Gravel Mine, near Michigan Bluff, to deposit tailings in Dutch Gulch and Poor Man's Creek; and William Phillips, in the Phillips Claim, near Colfax, to deposit tailings in Dry Creek gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on July 20th, 1896, at 1:30 P. M.

MINERS' OUTFITS.



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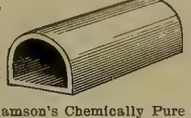

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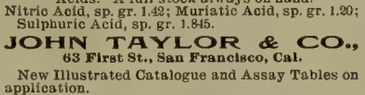

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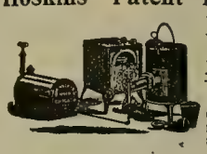

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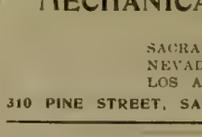

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RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
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D. M. BURNS, Superintendent.

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THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec'ty.

BULLION-BECK AND CHAMPION MINING COMPANY.
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THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.

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GREAT SALT LAKE AND HOT SPRINGS RAILWAY.
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SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO.
C. C. MCIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. MCIVER, President.

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No. 1880.—VOLUME LXXIII. Number 3. SAN FRANCISCO, SATURDAY, JULY 18, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

A Colorado Gold and Silver Mine.

Colorado excels in one thing. It is a superb advertiser. While it is inferior in aggregate gold production to California, it attracts more attention from investors because of the publicity its mining men give all their enterprises. Had the Colorado men such a field to exploit as we of California possess, they would doubtless rise to the splendor of the occasion and outdo even their present efforts.

Amid the many fine publications received descriptive of Colorado gold properties, none has been more elaborate in appearance than that recently issued by Leo Von Rosenberg, 35 Broadway, New York City, being a superbly illustrated description of the property of the Gold Coin Mines Co., Nevadaville, Colorado.

About 9000 feet above sea level, fifty miles west of Denver, lies the property treated of, some of which has had considerable deserved prominence by reason of the product and the unusual depth for Colorado, one mine, the California, having a shaft 2250 feet deep.

On this page is depicted an underground scene in the breast of the 700-foot level of the Indiana mine, the darker shading being intended to represent the smelting ore in the vein, the lighter the milling ore, also a view of the stope between the 700 and 800-foot levels. The ore is of an unusual kind, described as being "a mixture of auriferous copper pyrites, iron pyrites, zinc blende, with occasional spots of galena, associated with quartz in a porphyritic-granite matrix derived from the enclosing country rocks."

The gold is not visible in the ore, although it constitutes about seven-tenths of its total value. The minerals form two distinct classes of ore, which occur sometimes separately in the veins and at other times run side by side in well-defined pay streaks. The ore occurs in a succession of long swells or lenticular-shaped bodies, there called "shoots" or "chimneys." The country rock is granite gneiss, frequently cut by quartz-porphyry dikes.

At the time the photograph from which the picture below is made was taken—about three months ago—that level had a total length of 783 feet,

HANGING WALL. VEIN. FOOT WALL.

STOPE BETWEEN 700-FOOT AND 800-FOOT LEVELS, INDIANA MINE.

HANGING WALL. VEIN. FOOT WALL.

BREAST OF 700-FOOT LEVEL, INDIANA MINE, NEVADAVILLE, GILPIN CO., COLORADO.

of which 255 feet was on Indiana ground. At the face the ore body was 2 feet thick and in the level and the stopes it varied from 18 inches to 5 feet.

The 800-foot level, 148 feet below the 700-foot, has a total length of 1039 feet, of which 511 feet are in the Indiana ground. The ore body in this level shows considerable variation, the minimum being from three to six inches and the maximum about six feet. In the stopes the ore body is three feet thick.

The 900-foot level, 84 feet below the 800-foot, the leading level of the mine, is now 1121 feet long, 593 feet being in the Indiana territory.

Many of the present ore exposures in the various parts of the mine show the vein to carry smelting ore, varying from two to nine inches in thickness. No ore has been stoped below the 900-foot level.

On page 48 appears an illustration of the stope in the Indiana mine between the 800 and 900-foot levels.

Labor at Central City is cheaper than in any of the other precious metal mining districts in Colorado. The average is $2.50 for miners for each shift of ten hours; car men, helpers and surface men receive from $1.50 to $2.00 per day.

Much of the work of drifting, stoping and assorting of ore is done by contract. Drifts are run at from $5.00 to $7.00 per foot, while the cost of blasting ore in the stopes is from 50 cents to $2.00 per ton according to the varying width of the ore breasts. The company employs about 100 men at present.

Without any personal knowledge of the concern, the company appears to be fortunate in many respects, notably in intelligent, conservative management. When one realizes the loss to stockholders and the injury to a mining section so often occasioned by the ignorance or carelessness of a mine manager, it will be seen that the importance of this factor is not overrated.

For the three months ending March 31st, '96, the company produced in gold 3691.86 ounces, and in silver 14,744.36 ounces.

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Our latest forms go to press on Thursday evening.

J. F. HALLORAN.....General Manager

San Francisco, July 18, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Breast of 700-foot Level, Indiana Mine, Nevadaville, Gilpin Co., Colorado; Stope Between 700-foot and 800-foot Levels, Indiana Mine, 45. Stope Between the 800-foot and 900-foot Levels, Indiana Mine, Nevadaville, Gilpin Co., Colorado, 48. Part of the Nantasket Beach Line, Showing Overhead Trolley and Experimental Piece of Track Laid with Third Rail: This Shows the Comparison Between the Two Methods; Car on the Rail Moved by Third Rail Contact; Section of Truck Showing Method of Contact; Dynamo Room of Power House No. 1 of the N. Y. N. H. & H. R. R., 49. A Day's Shipment of Cable-Road Ropes, 53.

EDITORIAL.—A Colo ado Gold and Silver Mine, 45. Sales of Mining Property on Contracts; Loss of Gold in India; A Masonry Dam in the Yuba River; The Milling of Auriferous Gravels; The Copper Mining Outlook; Old Trinity and New Trinity; Of Local Interest, 46.

ELECTRICAL PROGRESS.—Electrical Advance in Railway Transmission; Electric Power at a Colorado Mine, 49.

SCIENTIFIC PROGRESS.—How Electricity Manifests Itself and What It Can Do; Exposure of Coal to the Weather, 50.

MECHANICAL PROGRESS.—The Coming Boiler; A Change of Practice, 50.

PRACTICAL INFORMATION.—How Poisons Act; When the Blood is Cold; A Simple Rule; Coal Tar for Making Colors; Difference Between Anthracite and Bituminous Coal, 50-51.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 54-55.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 62.

MISCELLANEOUS.—Concentrates, 47. Asbestos and Its Uses; A Novel Plan; Per Capita of Gold Money in the United States; A New National Park for Wyoming; Electrolytic Treatment of Low Grade Auriferous Copper Ores; A Marine Curiosity, 48. Notices of Recent Patents; Commercial Paragraphs; Recently Declared Mining Dividends, 51. Coast Industrial Notes; Shipment of Cable-Road Ropes, 53. Personal, 55.

IT is not uncommon for sales of mining property to be made on contracts by which part of the price is paid and possession of the mine given, this possession to be relinquished and the part payment made to be forfeited in case default is made in paying the balance of the price. The California Supreme Court has made a decision which would seem to bear a construction nullifying the forfeiture provision of such contracts, and making the amount paid, less actual damages to the property, recoverable in the event of default of full payment being made. A case in which this is the point at issue is now in the Montana Courts at Butte.

INDIA has always been considered an absorber of silver. That it is also an absorber of gold is not so generally known. An Indian statistician has been investigating, and his conclusions are of considerable economic interest. This absorption of gold he has considered, is an absolute loss of the metal in the manufacturing jewelry trade. The native goldsmiths use a coloring solution in which some of the gold they work with becomes dissolved. This solution and its valuable gold content is thrown away without any effort being made to recover the gold. Small in amount as this is for the day's work of one workman, so large is the number of workmen that he estimates that a ton of gold is wasted annually in the Province of Bengal alone. Ignorance is responsible for this loss, as three-fourths could be avoided by collecting and working the solutions now thrown away.

THE preliminary excavation work has been commenced on a 100-foot high masonry dam in the Yuba river above Smartsville. The purpose of the work is to furnish a fall for the development of electrical power for transmission to the Smartsville and Browns Valley mining plants, and to Marysville for general industrial use. Hydraulic miners generally will watch with interest the progress of this enterprise. It is gratifying to find the possibilities of profit in the development of electrical power so alluring that private capital hastens to anticipate the lagging Government. This dam in the Yuba river will take care of all the hydraulic mining tailings of Nevada and Yuba counties, and will enable the Debris Commissioners to expend the National and State appropriations in dams on other rivers where restraining works are required just as much as on the Yuba.

The Milling of Auriferous Gravels.

Where there is coarse gold in auriferous gravel there is fine gold. This elementary proposition seems to be lost sight of in the practice of milling the cemented gravels in the drift mines. Because the gold obtained is placer gold, and largely in coarse scales or grains, it is more often than otherwise assumed that there is no fine gold at all, or so little as not to be worth consideration. Whether or not fine gold is being lost that, as a commercial proposition, it would pay to save should in every case be determined. Samples of the tailings should be taken and parted by the finer mesh screen it is desired to compare with. It is taken as a fact that the practice being to get quantity through these mills, the screens used are, if anything, coarser mesh than a determination of the highest economic efficiency would suggest. The percentage of coarse tailings caught on the screen is determined, also their assay value, and from these two the gross loss per ton. From this should be subtracted the loss per ton in tailings that pass the finer screen, and the difference is, technically avoidable loss. Whether or not it is all the technically avoidable loss will require tests of identical samples with several screens till the screen mesh is determined beyond which no appreciable saving is made by a finer mesh screen. The assay samples required for these determinations of loss will have necessarily to be large, to get assay buttons that can be weighed. The maximum of technically avoidable loss and required screen mesh having been determined as indicated, the practical problem is how much of this must be sacrificed to save the remainder, which may be distinctively termed the commercially avoidable loss, at a profit margin over milling cost.

Trial mill runs should be made with several screen meshes, none of course with finer mesh than that determined in the sample test as the most efficient, technically, and the ton costs of milling ascertained. With increasing coarseness of screen mesh there is a decreasing ton cost of milling and an increasing technically avoidable loss in the tailings. The commercial ton cost of milling is that cost in which the decrease from the ton cost of milling with only technically unavoidable loss exceeds the technically avoidable loss per ton by an amount sufficient to cumulate a justifiable profit margin over the working cost of milling. This profit margin is necessarily a matter of the mine owners' judgment and will vary with conditions. It is suggested that it should be considered as interest on the investment in milling plant and determined accordingly.

The saving of a technical loss of 50 cents a ton by the expenditure of 60 cents a ton in increased cost of milling condemns itself as a commercial proposition. The saving of 40 cents of the 50 cents at an expenditure of 10 cents in increased cost of milling leaves a profit margin of 30 cents a ton which would commend itself as a commercial proposition.

The suggestion to assay is advised. Panning these tailings without grinding through a screen first will show no loss even though a common magnifying glass on the same tailings shows gold in fragments of the cementing matrix of the gravel. Even with grinding the panning tests would not show the amount of the gold loss with sufficient exactness.

Consideration should be given to the fact that there are variations in the amount of fine gold in the gravels of the same mine, which justify economically different rates of milling to maintain the uniform commercial profit margin indicated.

On this subject of milling auriferous gravels there is a notable lack of recorded data available for comparison and for the formulation of general rules of practice. About all that is generally conceded is that the tailings carry away gold sufficient in amount to make tailing claims below many of the mills profitable. What the tailing claims get, however, is necessarily but a fraction of the gold that passes the mill, and the results obtained in a few tests indicate that the loss is very considerable and commercially avoidable.

The Copper Mining Outlook.

The consumption of copper is a matter of considerable interest to miners on the Pacific coast at the present time. It is only a few years since the production of copper was so much in advance of the consumption that discoveries of copper ores on this coast attracted no attention from capital, and were economically unavailable. This is not the case now. Last year the consumption of copper was 8000 tons in excess of the year's production, and this year the demand indicates that production will be 35,000 tons short. Foreign consumption is increasing at the rate of 62,000 tons annually. This is the secret of the values in the Trail, B. C, ores, which, while they carry commercial quantities of gold, are technically copper ores. The Shasta county, Cal., ore deposits, while not yielding as large percentages of copper, have gold contents which, in connection with the copper, should and will make them commercially available. The problem for the California deposits is practically one of treatment of the ore. That these ores could not be treated profitably ten or fifteen years ago is no reason for neglecting them now. Metallurgical science in the treatment of ores, and particularly copper ores, has made enormous advances since then. Spokane capital has been quick to appreciate and appropriate the profit possibilities of the British Columbia copper-gold mines. San Francisco capital ought to secure the wealth of the gold-copper mines of California.

Old Trinity and New Trinity.

The Trinity county gold mining industry to-day is an excellent illustration of the effect of the successful investment of a single financially strong company in stimulating the development of dormant gold mining resources. As late as 1892 the superficial outlook for gold mining in that county was that its importance was decreasing with nothing more substantial than hope to build a belief in a change the other way. The gold production had been decreasing, the population was moving away, one mining property after another was closing, and though the mines that continued going were profitable, and the county still had its great quartz mine, the Brown Bear, the prevalent feeling was, that the mines then going were all. The annual gold production was then about $600,000. With the advent of the La Grange Company in 1893, taking one poorly equipped hydraulic mine and giving it a plant and water supply commensurate with its extent and gold content the unexpected happened. It was realized then by residents and mining investors from the outside that only the fringes of the vast placer deposits of the county had been mined, that claims that had been idle for years were not therefore worked out, and with the courage and faith born of imitation of a success, capital, enterprise and intelligence have taken these great placers and half-worked mines, and are rapidly bringing them among the great gold producers of the State. The annual gold product increased to $1,012,000 in 1894, to $1,167,000 in 1895, and the the returns of the first half of 1896 indicate that the ratio of increase will be kept up.

Of Local Interest.

Taking advantage of the failure of the Mineral Land Classification Act at the last session of Congress, and anticipating its passage at the coming session, the railroad is pushing the patenting of its grant lands in the mining counties through the local land offices and the Department at Washington. With the Government land officials assisting the railroad, the odd section mineral lands are being gobbled up so rapidly that the passage of the Classification Act by the next Congress will have the significance of the political platforms which gave the "law to the North and the nigger to the South." There will be no mineral land to classify, but the miners and prospectors of California will have the law.

There does not appear to be any method of applying a wholesale stopper to the wholesale grabbing of the mineral lands. There is, however, a line of procedure which can be used individually to protect the locations of miners and prospectors on these lands even where these locations are in the development stage of growth into mines. An official survey for patent should be applied for and made. In doing this the expense can be lessened and the effectiveness increased by consolidating the claims of adjacent owners. Follow this by application at the

local land office to enter the claims for patent, which will be refused on the ground that the approved filing of the railroad covers the land. The next step is to have a citation issue from the Land Office to the railroad directing it to show cause why the filing should not be cancelled. This brings up the issue of fact for judicial determination with the burden of evidence on the railroad end. This form of proceeding has been successfully followed in many cases where through fraud or oversight the railroad filing had been approved by the local land office and certified to Washington. It should prove effective in the cases where protests have failed from technicalities. Some of these were made on mines that have been continuously worked for twenty-five years and upwards, and from which gold is coming to-day. Modifications of the plan indicated will necessarily be required to meet particular cases. These need no elaboration here.

Concentrates.

ACCORDING to the local paper, there are no idle miners in Austin, Nev.

THE Prescott, Arizona, *Courier* wants a 20-stamp mill and ore reduction works built there.

THERE are three cyanide plants in operation in Tombstone, Arizona, and a fourth under construction.

THE U. S. Surveyor General's office at San Francisco is overcrowded with mineral survey applications.

EVERY mining paper in every locality tells of activity, new work, contracts let, getting ready to ship or mill ore, etc.

A COLORADO mining company, The Inter-Ocean, is said to insure all its employees for $5000 in an accident company.

REPORTS made to the Director of the Mint at Washington indicate that the world's production of gold for 1896 will be $220,000,000, against $203,000,000 in 1895.

RAINY LAKE DISTRICT, Minn., is a gold mining locality fast rising into importance. Two hundred stamps, the local papers say, will be crushing quartz by August 1st.

It is Part I of Aaron's assaying of which a third edition has lately been issued. There is no present intention or apparent necessity to issue new editions of Parts II or III.

A CONTRACT has been let for the construction of 11 miles of ditch to bring in the water of Whiskey and Boulder creek to the Princess hydraulic mine at Muletown, Shasta Co.

SHASTA COUNTY is to build a road which will connect Redding with the Bully Choop and Harrison Gulch mining districts, on the line between Trinity and Shasta counties.

"GILES OTIS PIERCE is connected with the Pike's Peak Mining Tunnel Railway Co." Very likely. That is just about the kind of thing Giles Otis Pierce would be connected with.

THE San Francisco company which recently incorporated to extract gold from the black sands of Fraser river, B. C., reports that 250 tons treated at New Westminster yielded $30 per ton.

THE Miners' Union of Cripple Creek ordered a strike of all members of the union on the 15th. The demands are that none but union men be employed, and that wages shall be $3 for eight hours' work.

"WHAT does Bryan's nomination denote?" asks an Auburn correspondent. Well, this paper is not in politics, but the event cited certainly denotes the convention's admiration of a rattling good speech.

THE disagreement between the Old Dominion Copper Co. and its employes at Globe, Arizona, has been settled satisfactorily. Men in the mine and smelter are to get $3 and general surface labor is to be paid $2.50.

NORTHERN ARIZONA is experiencing a water famine. Mines have had to close down and prospecting is impossible. The water supply of large towns on the A. & P. road has given out and water has to be brought to them by the trains.

THE days when fortunes can be picked up in California gold mines have not gone by yet. A large nugget has just been found in the Howland placer mine on Coffee creek, near Trinity Center, Trinity Co. It weighs 42 pounds and is valued at $9072.

AN injunction suit has been commenced in the Yuba Co. Superior Court against the Cleveland and Sierra Mining Co., who are hydraulicking near Scales, Sierra Co., to enjoin the discharge of the tailings into Rabbit creek, 100 miles above Marysville.

IT is stated in Redding that a contract is to be let for the erection of 500 small roasting ovens at the switchback on the Iron Mountain Railway, above Keswick. Men are grading the site for the roasters and building trestles and chutes, by means of which the ore will be handled by gravity.

GOLD to the amount of $1,800,000 was deposited for coinage the first day after reopening the San Francisco mint. This is practically the amount of gold that has been accumulating since the mint closed on June 30th. Its significance as indicative of the probable gold yield for 1896 needs no explanation.

THE San Francisco Mint resumed coinage on the 10th inst., after the annual examination and accounting was concluded. There are 11,000,000 ounces of fine silver in bars, which will be coined till further orders. The coinage for the year ending June 30, 1896, aggregated $22,955,500 gold and $1,377,451.50 silver.

EXPORTS of chrome ore from Turkey are reported to have greatly increased during 1895, the prices ranging from $17 to $18 a ton. During 1894 3080 tons were mined in California and shipped from San Francisco. In 1895 the shipments were 1740 tons. The variety of use and consumption of the ore is increasing.

THE revival of gold mining is drawing other enterprises in its train. Telephone lines are now reaching out to even the most distant mining towns in California. Sawyer's Bar, on Salmon river, in Siskiyou county, only accessible by wagon road since 1892, is to be connected with Etna, Fort Jones and Yreka by telephone.

COMMISSIONER LAMOREUX appears to have endeared himself in Montana much as he has in California. He has expressed himself there in opposition to the desire of the State to have the Yellowstone Park boundaries modified to permit a railroad construction to the New World mining district. What else could Montana have expected?

THE native labor question is still prominent in the Witwatersrand, South Africa, district. Over 1000 new men are monthly secured by paying a premium therefor. It is proposed to get even on this new tax by reducing the meager wages $2.50 per month, an attempted adjustment of expenditures that does not seem to promise permanent satisfaction.

IN the Cariboo, B. C., mining district, the British Northwest Gold Mining Co has organized with a capital of $5,000,000. It is a consolidation of the Fishback mine, the Maud Hydraulic Mining Co, and other Quesnelle properties. Seattle, Wash., residents and representatives of English bankers constitute the directorship of the biggest placer mining scheme ever proposed in that region.

THE devices employed by miners to overcome the difficulties they meet with are sometimes unique enough to be notable. Water carrying flumes have been built on iron brackets on the face of cliffs, as, for example, that on the Miocene ditch in Butte Co., and some Placer Co. miners suspended their sluice boxes along cliffs by ropes and worked an otherwise unavailable mining claim.

A NEW electrolytic method of treatment of low-grade auriferous copper ores is proposed by a Dr. Mulholland of N. S. W., a description of the process appearing in this number of the paper. If commercially successful there would appear to be a considerable field for its application in this country. There have been many unsuccessful efforts to work this class of ores in California by free milling, and to a limited extent by smelting.

THE grass root discoveries of chalcopyrite (copper-iron sulphide) ores carrying gold in British Columbia suggest a locality in Del Norte and Humboldt counties in this State, and in southwestern Oregon, where ores of this character have been found recently. Not being free milling quartz and unlooked for, the discoveries have attracted scarcely even local attention. If such ores are valuable in British Columbia why not in California and Oregon?

A GOLD discovery in Soledad canyon, Los Angeles Co., has caused several speculators to locate mining claims on patented "agricultural" land. While it is a question of fact as to whether the land is "agricultural," yet the possession of a U. S. patent by its holders renders useless any attempt to locate a mining claim thereon. It is a waste of effort to attempt the location of a mining claim on land held by a U. S. patent by any one other than the holder of the patent.

ADMIRAL SELWYN, who, sometime ago, publicly advocated in this city his "Zymean" process of gold extraction, writes to the *London Mining Journal* that the Rigaud process, now being tested at the works of the Total Gold Extraction Co., Havre, France, is virtually the process of which he is the inventor and patentee. The admiral opposes amalgamation and advises dry crushing. In some things the admiral is at sea, which is where one would naturally expect an admiral to be.

IN many of the placer gold districts of Alaska the ditches required to bring water on the claims are short. Ditch construction is, however, hampered by difficulties that offset this. It is usually necessary to build fires to clear the ground of the tangled mass of fallen timber and moss that covers the surface of the country to a depth of several feet, and in many cases to render it impossible to excavate. This surface condition also exists in the more northern districts of British Columbia in the Cariboo and Horsefly country.

A SYNDICATE in brimstone is the latest trust reported. The production of sulphur in Sicily, three-fourths of the world's consumption, is to be controlled by contracts with the mine owners, who, it is claimed, have been working on an unprofitable basis at the low prices that have been ruling. The sulphur mining industry in Louisiana, though not included in the trust, will be benefited, and the output from the mines there may, if their expectations of yield are realized, prove a serious obstacle to the success of the trust in this country.

FROM Redding a report comes of the projection of an iron mining enterprise in Shasta county carrying a number of other industrial developments in its train. The water of McCloud river is to be utilized in an electric smelting plant near the junction of the Pitt and Sacramento rivers. Water is to be piped from this point to Redding. A railroad is to be built from the mines to the smelter and thence to a connection with the Southern Pacific. The scheme is large, very large. It is some time since an effort has been made to smelt iron on this coast.

FOR three years J. C. White has been receiving from Yuba county $200 per month as a member of the Executive Board of the Anti-Debris Association. Mr. Phipps and Mr. Devlin are, among others, also under salary. The whole thing constitutes a heavy and unnecessary burden on the taxpayers of the counties furnishing the money to maintain a costly organization whose existence is rendered unnecessary by the activity and constant jurisdiction of the U. S. Debris Commission. The expenditures of the counties' money has been this week the subject of official investigation.

THE Pocahontas Gold Mining Co.'s property, according to the *Wall Street Reporter*, is a good thing—to which can be added that it is a good thing to let alone. While it is undoubtedly in California, because the *Reporter* says so, there is a vagueness of description of the locality and the property permissible in a romance writer relating a tale of pirate treasures, but very much out of place in the presentation of a mining proposition to the investing public. There are three Pocahontas mines in California, maybe more. Which one of them is masquerading in the account referred to?

THE *Star* thinks that the recent visit of the supervising special agent of the Treasury Department to Nogales, Arizona, will result in the erection of a Government sampling works there at a cost of $10,000. A late appropriation by Congress for the establishment of such works sets aside $45,000 for three Government works, one to be at El Paso and the other two on the northern boundary. The act provides for the erection of other works, or rather for the erection of additional facilities for the collection of customs, the expense of such additional facilities to be paid for not out of the appropriation, but out of the usual fixed fund for the maintenance of the customs service. An average of four tons of ore daily passes through Nogales.

THE Minister of Mines in British Columbia endeavors to keep in working touch with the industry in his charge. Instead of publishing annual reports alone, which lose their possible utility by delay, the reports are published as rapidly as the data comes in, in bulletins, which, dealing with conditions to-day, are available to be read to-day. We have no official position in this country corresponding to the Minister of Mines, but the U. S. Geological Survey and several State mineralogists and geologists might make a try at the practical work done by our neighbor.

THE gathering of float boulders of ore appears to be quite a profitable industry in a number of mining districts outside of California. Shipments of this character are made by the carload, sometimes the trainload, in the Black Hills, S. D., and in the Rossland District, B. C. In this connection it is notable that incorporations have been made of properties in the latter locality that are floating out to the mining stock investors on this unsubstantial float. With the report that profitable shipments of float are being made comes the significant statement that no ledge has been found yet.

A SEQUENCE of the closing down of the hydraulic mines since the Anti-Debris agitation commenced has been the abandonment and destruction of many of the extensive and costly reservoir and ditch systems which supplied them with water. In all of the mining counties miles of these old ditches and broken down flumes can be seen. Some few of them may be restored for hydraulic mining, and occasionally to supply power for a quartz mining plant. For this last-named purpose the utility is limited, the water season of many of them being short and interrupted by snow. The old reservoirs, however, remain useful for storage for the new ditches for irrigation and water power developments that are being made at elevations below the snow line. The rapidly growing demands on these have necessitated storage to supplement the dry season shortage of the stream flows. All of the old mining reservoirs, however small, are thus recovering their original value, and the reservoir sites that still remain unutilized are being acquired by the water companies in anticipation of being needed in the near future.

THE Commissioner of the Land Office has issued a circular letter to the Registers and Receivers at the District Land Offices, calling attention to the fact that a strict compliance must be made by applicants for mineral patent with Paragraph 35 of the mining circular approved Dec. 10th, 1892. The paragraph says: "The notices so published (in a newspaper) and posted must be as full and complete as possible, and embrace all the data given in the notice posted upon the claim. By departmental decision of May 23, 1896, in the case of Gowdy vs. Kismet Gold Mining Company, it was held that a strict compliance with said paragrapn 35 will be insisted upon and in that case republication was required by reason of the fact that the published notice failed to contain a reference to the names of adjoining or nearest claims. In view of the fact that most published notices fail to comply in some particular with the above quoted regulations, your special attention is called to said decision and you are enjoined to comply with said regulations in the preparation of notices for publication. Said decision will be found reported in volume 22 of Land Decisions when the same shall be published."

THE courts, in deciding mining cases, have been exceedingly liberal in construing the requirements of the law to make locations of mining claims. The technical accuracy of description of the claim in the notice of location has never been held to be essential to make a valid location. Nevertheless it is well that locators should be particular in this matter. Litigation would be avoided in many cases, and the work of perfecting title simplified and rendered less tedious and costly. The Interior Department, when it comes to patenting a mining claim, is exacting where the courts are liberal. It is frequently necessary to relocate a mining claim, and to make an entirely new chain of title to the owners before an official survey for a patent can be made. This involves delay and expense which can be avoided by accuracy in the location notice in the first instance. It is not necessary to have the location made by a survey, though it is preferable usually. The essentials are: 1st, That the corners should be marked on the ground by stakes in mounds of earth or rock, or by marked trees or other natural objects; 2nd, The notice of location should describe these corners so that they can be identified on the ground by the description, and, in addition, the direction and distance of one of the corners from a Government corner, or well-known permanent object, such as a junction of roads, trails, or ravines, a bridge, building of any kind, or natural rock monument or mountain peak should be given. It costs no more at the time of locating to observe these two requirements, while later on they may mean a considerable economy of time and money.

WITH its usual enterprise this paper, the pioneer in the mining and mechanical industries, is essaying the difficult task of publishing a list of the mines of the State, their character and location, and the name and address of the owner or superintendent. In the course of publication much commendation is received and some adverse criticism. The latter is chiefly valued, is expected, and is mainly deserved. At the outset it was plainly and candidly stated that the matter was only an approximate attempt, with no claim to absolute accuracy, and solely with a view to approach some degree of correctness in the important project essayed. The enormous demand for back numbers containing the lists indicates that manufacturers and dealers are not unmindful of the commercial value of such a list. Its publication has practically made unnecessary the appearance of ephemeral publications of doubtful business value. In this regard, however, it is in order to say that no list such as is now being published in these columns is of much value longer than six months. Miners are migratory, and herein lies the value of this paper as an advertising medium. Whenever a mining man changes his address, about the last thing he does when leaving or the first thing after arriving at his new location is to write this office, ordering his paper changed to his new address. The MINING AND SCIENTIFIC PRESS follows him wherever he goes; its value is a constant one. A list however accurate is good only for a very limited time, a fact not always readily recognized by senders of circulars, etc. Upon completion it is contemplated to issue the list in its entirety, corrected to date.

Asbestos and Its Uses.

There is probably no production of inorganic nature about which there is so much popular mystery and misconception as asbestos. It is vaguely understood that the principal claim of this remarkable product to attention is that it cannot be consumed by fire. It is of more importance to the human race to day than it has been in the whole range of history. Asbestos twenty-five years ago was practically not known in the laboratory of the chemist or mineralogist. It now finds its way in one form or another into every workshop where steam is employed.

To the question, "What is asbestos?" it is not altogether easy to find an answer. Geologists classify it among the hornblendes. In itself, asbestos is a physical paradox, a mineralogical vegetable, both fibrous and crystalline, elastic yet brittle, a floating stone, but as capable of being carded, spun and woven as flax, cotton or silk. It is, apparently, a connecting link between the vegetable and mineral kingdom, possessing some of the characteristics of both. In appearance it is light, buoyant and feathery as thistledown; yet, in its crude state, it is dense and heavy as the solid rock in which it is found. Apparently as perishable as grass, it is yet older than any order of animal or vegetable life on earth. Seemingly as combustible as tow, the fiercest heat cannot consume it, and no known combination of acids will destructively affect the appearance and strength of its fiber, even after days of exposure to its action. It is, in fact, practically indestructible. Its incombustible nature renders it a complete protection from flames, but beyond this most valuable quality, its industrial value is greatly augmented by its non-conduction of heat and electricity, as well as by its important property of practical insolubility in acids.

Asbestos has been found in all quarters of the globe. It comes from Italy, China, Japan, Australia, Spain, Portugal, Hungary, Germany, Russia, The Cape, Central Africa, Canada, Newfoundland, this country, and from South and Central America. The asbestos generally found in the United States, especially in Virginia, the Carolinas, and Texas, also in Staten Island, New Jersey and Pennsylvania, is in appearance like fossilized wood. The veins range in length from a few inches to several feet.

Notwithstanding this wide distribution of asbestos, the only varieties which at present appear to demand serious consideration from a commercial point of view are the Russian, the South African, the Italian and the Canadian. The principal claim possessed by the Russian fiber to a place in this quartet is based on the enormous extent of the deposits which have been discovered in east Russia, beyond the Ural mountains, and Russian Siberia. So far, their specimens have been of comparatively poor quality. The yield is used almost entirely in Europe, where it is mixed with the Canadian for spinning, making paper, and other purposes where an inferior grade can be utilized.

As a matter of fact, Canada contains the great asbestos region of the world, in the sense that while its mines are practically unlimited in productive capacity, the product is of a quality which fully meets the requirements of the newest and most exacting of the innumerable uses that are daily found for it.

One of its special uses is for wall-plaster. This is a new application which will have a distinct effect in modifying the practice of indoor plastering. Instead of the tedious and elaborate preparation of studs and strips, and the use of inferior and dust-creating mortar, with its after-scoring, which is necessary to give adhesion to the final coat of plaster of paris, a single coat of the asbestos is laid on. It has a glossy surface which will not crack, as, while firm, it is perfectly flexible. It can be put on the raw brick; and a room of which the walls have been built in the morning can, before night, have a smoothly finished interior surface, shining like glass and as hard as a rock. A kindred application of asbestos is now coming into vogue in the shape of uninflammable decorations for walls and ceilings. These are used a great deal for the saloons of steamships.

Firemen clad in asbestos clothing and masks, as are those of London and Paris, can walk through the hottest flame with comparative impunity. Asbestos fireproof curtains have reduced the mortality of theater fires to a very appreciable degree.

Probably one of the first applications of asbestos in this country was to roofing. To buildings covered with this material the shower of sparks from a neighboring conflagration involves no danger. The fact that woodwork can, by its use, be made uninflammable has come to be an important factor in the insurance of buildings. One of the largest branches of asbestos manufacture is that of sectional cylinders for pipe coverings, for retaining the heat of steam and other pipes, felt protective coverings for boilers, frost-proof protections for gas or water pipes, and cement felting, which can be laid on with a trowel, for the covering of steam pipes, boilers, or stills. In some of these cases, where it is only necessary to retain the heat, the asbestos is mixed with other substances; but where the protection must be fireproof as well, only asbestos is used.

Another very extensive department in asbestos manufacture is that of packings. Of these there are an infinite number of forms. The making of asbestos paper varies from the building up of the thickest millboard to the production of a writing paper which, from its indestructibility, is invaluable in case of fire for preserving charters, policies, agreements and other important documents. To the electrical engineer asbestos is absolutely indispensable.

A considerable part of an asbestos factory is devoted to weaving, the asbestos being first drawn into thread for that purpose. Here again is an apparently endless diversity. There is the fireplace curtain blower and filtering cloths for many purposes, from straining molten metal to clarifying saccharine juices in beet sugar refineries. A cloth is made for straining and filtering acids and alkalies in chemical laboratories. The filter can be thrown into the fire, and after the residual matter has been consumed the web is as good as new. For filtering purposes generally asbestos has a unique adaptability, and in tropical countries it is held in grateful estimation as a cooler and purifier of water. The newest departure in the asbestos field is the construction of electrothermic apparatus. The heating effect of the electric current is utilized by embedding the wire in an asbestos sheet or pad. Another application of the same principle is to car heaters.

[The increasing use of asbestos gives importance to its occurrence in California. It is found in many localities in the mining counties, frequently of excellent quality. It is being mined to some extent, the production being taken by factories in San Francisco. Prices about $30 a ton are obtained.—ED.]

The Nicaragua Canal.

The report of the Committee on Interstate and Foreign Commerce to the House of Representatives, recommending the financial aid of the Government in the completion of the Nicaragua canal, has been issued from the Government Printing Office. The committee say that the advantages to be derived from the construction of this great interoceanic waterway are so vast, that the canal should be built, even though the cost of construction exceed the figures of the Board of Engineers. In their opinion, the Government should assist the company in the completion of the work, even if it costs over $150,000,000; but if, as they believe, it can be constructed for about $100,000,000, so much the better. The canal should be built as a matter of national need.

ON one of the Northwestern railways, running from Minneapolis to Sault Ste. Marie, the firemen are hired, not by the company, but by the engineers. The plan has been tried for a year and a half, and the officers are so well pleased with it that they think of trying it on the trainmen. The conductors ultimately may be allowed to select their own brakemen.

Electrolytic Treatment of Low-grade Auriferous Copper Ores.

Dr. Mulholland, of Bathurst (N. S. W.), proposing a new process for the treatment of low class of ores explains the main features of the proposed treatment as follows: The ore, being finely ground, is at once leached with a hot solution of cupric chloride in a rotating barrel, through which a slow alternating current of electricity is passed. The cupric chloride solution is mixed beforehand with a saturated solution of calcium or magnesium, chloride, or salt, so that the combined action, chemical and electrical, extracts all the copper from the ore. The clear solution is run through a barrel containing copper oxides or hydrates, which remove all iron and similar impurities from the solution, leaving it only pure copper. The copper solution is now passed into rectangular vats containing porous asbestos partitions, with electrodes for conveying the current to the solution as it passes in the vats. The copper is deposited, and the solution is pumped back to a reservoir for treating more stuff. Once the solution is made it lasts indefinitely, a little water being added to make up for evaporation, and a little chemical to supply losses by leakages, etc. Thus there is no cost after the preliminary charges, except for fuel for the engines required for crushing, working the dynamos, pumps, etc. The process is circular, and, under good management, extremely economical. Thus the copper is saved, and as the average market price is £40 per ton it will pay with even a one per cent ore, and lower, for its own extraction. The ore, being freed from copper, and chemically disintegrated, is in an excellent condition for treatment by cyanide or other suitable method. If there are silver sulphides in the ore they are dissolved, and are precipitated before the copper, so that the silver deposit may be stripped from the cathode before the copper is allowed to deposit, or it may be separated by chemical means.

STOPE BETWEEN THE 800-FOOT AND 900-FOOT LEVELS, INDIANA MINE, NEVADAVILLE, GILPIN COUNTY, COLORADO. (*See page 45.*)

ONE of the marine curiosities recently fished from the bottom of the Indian ocean by a dredging vessel in the employ of the Calcutta Society of Natural History was a mammoth sea crab, which continually emitted a bright white light, similar to that seen in the spasmodic flashes of phosphorescent luminosity, kindled by our common fireflies. The oddity was captured in daytime and placed in a large tank, nothing peculiar except its immense size being noticeable in the sun. At night, however, the crab surprised the naturalists by lighting up the tank, so that all the other sea creatures occupying the same tank could be plainly seen. When the luminous crustacean was prodded with a pole, he emitted flashes of light which enabled the experimenters to read small print, even though otherwise they were in total darkness.—St. Louis Republic.

Electrical Progress.

Electrical Advance in Railway Transmission.

In the issue of the MINING AND SCIENTIFIC PRESS of July 4th appeared the following paragraph:

Chief Electrician Heft of the New York & Hartford Railroad ran an electric car at the rate of eighty miles per hour over a tangent between Nantasket Beach and Hull, Mass., last Saturday.

This deserves more extended notice, as it was the first time in the history of railroads that the main line of a surface steam railroad has been operated by electricity taken from a conductor laid upon the ground, as the Nantasket branch, inaugurated just twelve months ago, was the first steam road in the world to which electricity was solely employed as the motive power.

While the third rail system for electric roads is not new, it being in use on the West Side & Lake Street Elevated Railway in Chicago, the rail being set outside the track, this is the first instance of a third rail being laid upon the permanent way of a trunk steam road, between the rails of the service track. The preliminary work was carried out at the Schenectady works of the General Electric Co.

The current for the third rail section is brought from power house No. 1 on the Nantasket line over two insulated feeders of copper cable laid along the tops of the poles which carry the overhead wires of the Nantasket line. At the Nantasket Junction station the feeders are dropped to the ground, and each is connected to its own third rail.

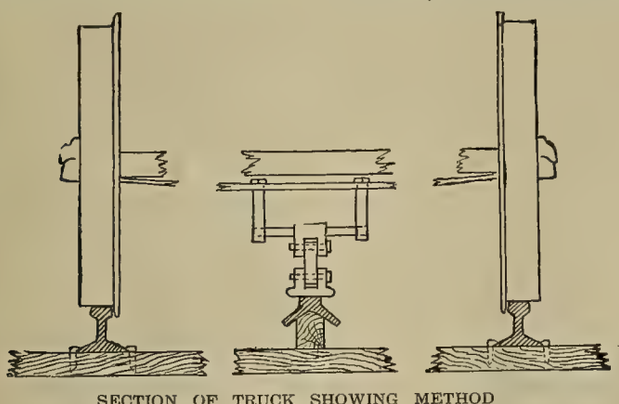
The third rail is of peculiar shape—the end-view resembling a flattened A. It is laid midway between the two service rails of each track. Each section of third rail is 30 feet long and weighs ninety-three pounds to the yard. It is supported by three ash blocks to each section, the blocks being set into the ties. Before use these blocks are boiled in vacuum pans with a tar compound, and thus each pore is filled with insulating and preserving material. The insulation is almost perfect. The continuity of the third rail circuit is secured by attaching each end of one rail to that of the next by means of two heavy copper bonds.

PART OF THE NANTASKET BEACH LINE, SHOWING OVERHEAD TROLLEY AND EXPERIMENTAL PIECE OF TRACK LAID WITH THIRD RAIL: THIS SHOWS THE COMPARISON BETWEEN THE TWO METHODS.

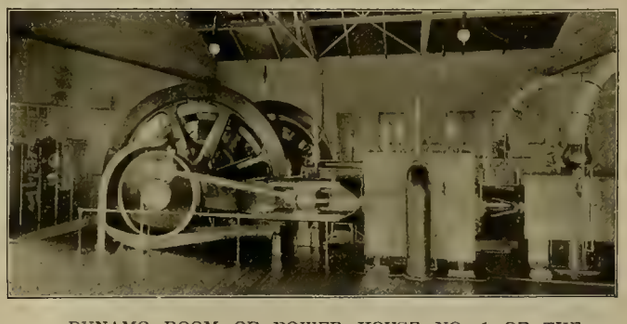
CAR ON THE RAIL MOVED BY THIRD RAIL CONTACT.

The electricity is taken from the third rail by two sliding shoes hung loosely from the car, one suspended between the axles of each truck immediately under the king pin by two links, which allow it to slide easily over the top of the third rail and make perfect contact with it all the time. The current is brought to the motors through the controllers and circuit breakers, and returns to the track rails by the wheels. The continuity of the return circuit is secured by using a short, thick bond of copper cable to join together the ends of each pair of track rails, the ends of the bond being fastened into the flange of the rail. The distance between each of the two shoes on the car is 33 feet. No third rail is laid at the crossings, the circuit continuing between the broken end by means of lead-covered cables. At the crossings less than 30 feet wide one of the shoes is always in contact; at wider ones the impetus of the moving car brings the shoes into contact again before the car can come to rest.

The baggage cars in use last year, each equipped with four motors, have been abandoned, and the large sixteen-bench open cars are alone employed as motor cars or locomotives. Sixteen of these cars will be put into service, each equipped with two General Electric 2000 motors, two series, parallel controllers, two automatic circuit breakers—the safeguards from accident to the rest of the electrical apparatus—and an air pump and motor for the compressed air for the whistle and brakes. The air pump combination is automatic in its action. As soon as the pressure in the main air tank falls below ninety pounds to the square inch a small knife switch is closed by a spring, and the motor starts. The switch is forced open by the air pressure as soon as that in the tank reaches the normal.



SECTION OF TRUCK SHOWING METHOD OF CONTACT.



DYNAMO ROOM OF POWER HOUSE NO. 1 OF THE N. Y. N. H. & H. R. R.

Electric Power at a Colorado Mine.

An interesting description was recently published in these columns of the electric power transmission installation at the Virginius mines of the Caroline Mining Company at Ouray, Colo.

This was one of the first power transmission plants installed in this country and its operation since its installation in 1891 has been continuous.

The Virginius mines are situated near the summit of Mount Sneffles, in a region of perpetual snow, some 12,700 feet above the level of the sea or 5,000 feet above the timber line. They consist of some mines rich enough to repay mining under the most adverse circumstances and of others containing a low grade of ore which could not be mined profitably without cheap power. This power is derived from the water of the Red Canyon creek, which is brought through a pipe line 4000 feet long to Pelton wheels which drive G. E. bipolar dynamos. The transmission line passes first through dense timber, then over rocks and chasms and heavy snowdrifts until it reaches the mine four miles away from the power-house. The current is direct and the voltage 800 volts. The motors drive hoists, pumps, blowers, stamping mills, drills, and an order has recently been given the General Electric Company, which put in the original plant, for an 800-volt, 2-motor mining locomotive.

Access to the mines in winter is impossible and in summer extremely difficult, and before the adoption of electricity the Caroline Mining Company was paying $18 a ton for its fuel, the expense of this item amounting to over $100 a day. Mr. A. E. Reynolds, the manager, recently said: "Probably the most forcible way in which I can explain the advantage of this plant is to state that without it, it would be impossible to operate the mines, as our expenses would be prohibitory."

Scientific Progress.

How Electricity Manifests Itself and What it Can Do.

A. E. DOLBEAR.*

It may be well to point out at the outset what has occasionally been stated, but which, in my judgment, has not received the philosophical attention it deserves, namely, that electrical phenomena are reversible, that is, any kind of a physical process which is capable of producing electricity, electricity is itself able to produce. Thus, to name a few: If mechanical motion develops electricity, electricity will produce mechanical motion; the movement of a pith ball is a simple case. If chemical action can produce it, it will produce chemical action, as in the decomposition of water and electroplating. As heat may be its antecedent, so will it produce heat. If magnetism be an antecedent factor, magnetism may be its product. What is called induction may give rise to it in an adjacent conductor, and, likewise, induction may be its effect.

Let us suppose ourselves to be in a building in which a steam engine is at work. There is fuel, the furnace, the boiler, the pipes, the engine with its fly-wheel turning. The fuel burns in the furnace, the water is superheated in the boiler, the steam is directed by the pipes, the piston is moved by the steam pressure, and the fly-wheel rotates because of proper mechanism between it and the piston. No one who has given attention to the successive steps in the process is so puzzled as to feel the need of inventing a particular force, or a new kind of matter, or any agency, at any stage of the process, different from the simple mechanical ones represented by a push or pull. Even if he cannot see clearly how heat can produce a push, he does not venture to assume a genii to do the work, but for the time is content with saying that if he starts with motion in the furnace and stops with the motion of the fly-wheel, any assumption of any other factor than some form of motion between the two would be gratuitous. He can truthfully say that he understands the *nature* of that which goes between the furnace and the wheel; that it is some sort of motion, the particular kinds of which he might make out at his leisure.

Suppose once more that, across the highway from this engine house, there is another building, where all sorts of machines—lathes, planers, drills, etc. —are running, but that the source of the power for all this is out of sight, and that one can see no connection between this and the engine on the other side of the street. Would one need to suppose there was anything mysterious between the two—a force, a fluid, an immaterial something? I am asking the question on the supposition that one was not aware of the shaft that might be between the two buildings, and that it was not obivous on simple inspection how the machines got their motions from the engine. I think no one would be puzzled because he did not know just what the intervening mechanism might be. If the boiler were in the one building, and the engine in the other with the machines, he could see nothing moving between them, even if the steam pipes were of glass. If matter of any kind were moving, he could not see it there. He would say there *must* be something moving, or pressure could not be transferred from the one place to the other.

Substitute for the furnace and boiler a galvanic battery or a dynamo; for the machines of the shop, one or more motors with suitable wire connections. When the dynamo goes the motors go; when the dynamo stops the motors stop; nothing can be seen to be turning or moving in any way between them. Is there any necessity for assuming a mysterious agency, or a force of a *nature* different from the visible ones at the two ends of the line? Is it not certain that the question is, how does the motion get from the one to the other, whether there be a wire or not? If there be a wire, it is plain that there is motion in it, for it is heated its whole length, and heat is known to be a mode of motion, and every molecule which is thus heated must have had some antecedent motions. Whether it be defined or not, and whether it be called by one name or another, are quite immaterial if one is concerned only with the *nature* of the action, whether it be matter or ether, or motion or abracadabra.

Once more: suppose we have a series of active machines. An arc lamp, radiating light waves, gets its energy from the wire which is heated, which in turn gets its energy from the electric current, that from a dynamo, the dynamo from a steam engine, that from a furnace and the chemical actions going on in it. Let us call the chemical actions *A*, the furnace *B*, the engine *C*, the dynamo *D*, the electric lamp *E*, the ether waves *F*.

The product of the chemical action is molecular motion, called heat in the furnace. The product of the heat is mechanical motion in the engine. The product of the mechanical motion is electricity in the dynamo. The product of the electrical current in the lamp is light waves in the ether. Nobody hesitates an instant to speak of light waves as forms of motion, for they are described as undulations in the ether at right angles to the direction of the radiation. No one hesitates for an instant to speak of the heat as being molecular motion, nor of the motions of the engine as being mechanical; but when we come to the product of the dynamo, which we call electricity, behold, nearly every one says, not that he does not know what it is, but that no one knows! Does any one venture to say he doesn't know what heat is, because he cannot describe in detail just what goes on in a heated body as it might be described by one who saw with a microscope the movements of the molecules? If any body of any magnitude moves, it is because some other body in motion and in contact with it has imparted its motion by mechanical pressure. Therefore, the ether waves at *F* imply continuous motions of some sort from *A* to *F*. That they are all motions of ordinary matter from *A* to *E* is obvious, because continuous matter is essential for the maintenance of the actions. At *E* the motions are handed over to the ether, and they are radiated away as light waves.

A puzzling electrial phenomenon has been what has been called its duality—states which are spoken of as positive and negative. Thus, we speak of the positive plate of a battery and the negative pole of a dynamo, and another troublesome condition to idealize has been, how it could be that, in an electric circuit, there could be as much energy at the most remote part as at source. But, if one will take a limp rope, 8 or 10 feet long, tie its ends together, and then begin to twist it at any point, he will see the twist move in a right-handed spiral on the one hand, and in a left-handed spiral on the other, and each may be traced quite round the circuit; so there will be as much twist, as much motion, and as much energy in one part of the rope as in any other; and if one chooses to call the right-handed twist positive, and the left-handed twist negative, he will have the mechanical phenomenon of energy distribution and the terminology analogous to what they are in an electric circuit. So far, there is no trouble; but one can see the rope as a whole twisting, and nothing can be seen in an electric conductor. Are not the cases more dissimilar than the mechanical analogy would make them seem to be?

(To be Continued.)

* Journal Franklin Institute.

THE amount of loss suffered by coal from exposure to the weather is considerable—far greater, indeed, than is generally known. The results of recent analyses show in some cases a total loss in weight from this cause amounting to 33.08 per cent, while the deterioration in quality for purposes of fuel or gas making reaches a still higher figure.

Mechanical Progress.

The Coming Boiler.

From an address before the Boilermakers' Association, Cleveland, by G. B. Hartley, of Philadelphia, the following abstract is taken:

The era of high pressure is here, and the limit has already been reached in the construction of the old types of steam generators. This fact is presenting itself to the boiler manufacturers, many of whom are yet fighting the battle, born of prejudice, against the water tubular types. Much of this is no doubt due to the imperfections of design and use of cast iron parts of many of the more prominent of the pipe boilers now in the market. The fact that this is true furnishes additional encouragement for boiler makers to turn from their old types to the making of the more perfect sectional boiler that engineering now demands not only for stationary purposes, but for marine uses. It is in this latter service that the limit has arrived. Instance the boilers of the St. Louis and St. Paul, as well as those on the vessels of our new navy. Think of the immense weight of boilers from 15 to 17 feet in diameter when filled with water. It is unnecessary to speak of the loss of so much valuable space taken up by the eight or ten of these immense generators. The shell plates are of $1\frac{9}{16}$ inch thickness, which, with their diameter, permits of a pressure of 200 pounds per square inch. Neither weight of metal nor skill and strength of workmanship required in the construction of these types will permit this thickness to be exceeded. Thus we have reached the maximum on shipboard. We therefore have four immediate reasons for development and adoption of a water tubular boiler for marine uses: 1, To obtain less weight and space; 2, less first cost and less cost of repairs; 3, economy of operation in development of high pressure; and lastly, reducing the dangers of the present explosive boilers to a minimum.

In turning to stationary boilers a wider field of choice is presented for higher pressure. The horizontal return tubular type, with its limit of diameter and thickness of shell, must be abandoned and the internally fired and water tubular designs be adopted. As a fact there are so many heat units in a pound of coal; how to impart this heat to the making of steam is the problem. It seems that the internally fired boiler, properly designed so that steam making heat is not wasted in the chimney, is the solution, as, of course, the boiler will be properly covered by non-conducting material. Again, this type possesses the advantage of a large disengaging service and plenty of steam space, and can be built to carry a working pressure as high as there will ever be necessity for.

The water tubular boiler must lose considerable by reason of brickwork setting, which latter must be kept in good repair to prevent cold air from sucking through the cracks, while the disengaging service in the steam space in the design to date is believed by many engineers to be their weakest feature.

Another reason for the passing away of the old types, and one which causes much objection also, applies to the internally fired boiler. This is the cost of repairs. When an inspector finds a defect in these boilers it necessitates half rims, new sheets in fire box, etc., making it necessary to take tubes out to do the work properly. This not only increases the actual cost of repairing the boiler to a considerable amount, but consumes just so much time that the manufacturing plant must remain idle. If it were a water tubular boiler, all sections of which can be duplicated at short notice, the savings here would prove more by far than the additional first cost of the latter type. It is for these reasons that our boiler manufacturers must revolutionize their business—not for the sake of the economy of fuel, but for the sake of higher pressures and for economy in keeping in repair.

A CHANGE of practice, which is simplifying and increasing the useful work of machinery, is the displacement of the belt transmission of power in favor of direct connection of the motive power and machine. This has largely been made practicable through the improvement in electric motors and the development of the high-speed engine. It has also become the usual practice in electric light and power plant installation where water is the motive power. The suggestiveness of the results obtained has not been lost on the mining engineers, where water is available under high pressure. Water lends itself to the same effective economic divisibility as electricity, and in many mining plants of recent construction, instead of the power from one water wheel being transmitted by belt and shafting to stamp batteries, rock-breakers, concentrators, fans, hoists and pumps, each machine has its own water-wheel, direct-connected, except in the case of the stamp battery, where one belt is frequently all that is necessary to make the proper reduction in speed. This system of water power application, besides doing away with the numerous belts, shafts and pulleys and saving the power required to meet their frictional losses, makes possible a saving in initial construction of building framing and a direct saving in water consumption, by reason of most of the operations about a mining plant being intermittent. The water is shut off when not being used in useful work and cumulates rapidly into dollars where water is purchased by the cubic foot or inch. In another equally efficient way the saving in water made renders it possible to use water power where its use would otherwise be impracticable by reason of the shortness of the supply.

Practical Information.

How Poisons Act.

Carbolic acid produces immediate vertigo and intoxication, with burning pain along all points of contact. The breathing becomes stertorous and the pupils of the eye contract.

Phosphorus in overdose produces irritation and disturbance over every part of mucous it touches, and the contents of the stomach when removed are luminous as is phosphorus.

Prussic acid is the most rapid of all poisons, killing like a stroke of lightning. A teaspoonful of 2 per cent prussic acid will kill. In a few seconds after the liquid is taken the face turns bluish and the person sinks to the floor.

Opium, morphine and the like produce a period of exaltation, followed by stupor, which merges into death.

Strychnine is followed by convulsions; the head jerks back and the body rests on the head and the heels, arched like a bow. These spasms come intermittently till death.

THE following is a simple rule for the approximate determination of the cubic contents of a proposed reservoir construction to be made by building a dam across a valley suitable for use for that purpose: Multiply the flooded surface area of the proposed reservoir in square feet by two-fifths of the maximum depth of water proposed. This will give the content in cubic feet. Divide by 2300 to get the content in miners' inches.

IF it be a fact that murderous deeds are done in cold blood, the proper time for such sins should be between 11 at night and 1 in the morning, for it is in this interval that the temperature of the human body falls to its minimum. Healthy beings go regularly through a daily cycle of variable warmth. The maximum heat is reached at 9 A. M., when in persons under 25 the temperature stands at 99° Fahrenheit, and this is maintained until 6 P. M., when it slowly and steadily falls till an hour before midnight; the amount of decrease by this time is something over 2°. At

about 3 A. M. the upward turn is taken and the heat increases till 9 o'clock. It is curious that this extent of change only occurs in young bodies, for old people preserve a nearly equal degree of warmth all the twenty-four hours through. Other notable facts are that eating and drinking have nothing to do with the variations, and that hot and cold baths do not appear to interfere with the regularity of the successive changes.

COLORS excellently adapted to the cheaper kinds of painting can be made by employing coal tar instead of oil as a vehicle. Coal tar paints cover a larger surface by one fourth than an equal weight of oil colors, require no varnishing and dry very quickly. They may be applied on fresh plaster, damp walls, cement, wood or metal, and moreover possess disinfecting properties, due to the carbolic acid they contain.

A SIMPLE characterization of the difference between anthracite and bituminous coal is practically in the amount of volatile substances that can be driven off by the application of heat; thus, anthracite coal contains from 5 to 10 per cent of volatile matter, the remainder being carbon and ash, while bituminous coal has from 17 or 20 up to as high as 36 per cent.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GAME APPARATUS.—R. M. Nachmias, San Francisco, Cal. No. 563,507. Dated July 7, 1896. This invention relates to a game, and consists of cubical blocks having pictorial representations upon their sides, and in conjunction therewith of a series of cards, each card having a figure upon it, corresponding with one of the figures upon the block. Thus the pictures of a number of horses may be printed upon the sides of the blocks, and a corresponding picture of each horse upon one of the cards. The cards will be distributed to as many people as may desire to play in the game, and the blocks or dies being then thrown, whichever one comes uppermost wins, so that a number of famous horses may be pictorially represented, and the result of a race between the horses will be shown by the winning figure upon the block.

ADJUSTABLE HINGE AND WINDOW LOCK.—Robert R. Strain, San Francisco, Cal. No. 563,430. Dated July 7, 1896. This invention relates to sash hinges and locks, and particularly to a device which is especially adapted for use in connection with window sashes so that a hinge connection may be readily made and broken between the sash and its frame, thus allowing the sash to swing inwardly about its hinge connection so that the outer surface can be cleaned without danger. The device also serves as an effective lock. It consists of a main leaf secured to the stile of the window sash, or to the window casing, having a recess formed in its center, a second and smaller leaf corresponding in size and shape with the recess of the main leaf and adapted to fold therein so that the surfaces are flush when the leaves are closed, a smaller leaf having an open slot in its lower edge and a stop over which the slotted end of the smaller leaf is detachably fitted when the leaf is turned outwardly to form a hinge connection between the sash and its casing. This leaf may also be turned outwardly when the sash has been closed so as to engage a stop upon the casing and thus form a lock to prevent the sash being raised.

CAR COUPLING.—John C. Look of San Jose, Cal. No. 563,389. Dated July 7 1896. This coupling belongs to that class in which the locking device is adapted to be raised, to uncouple, by a rock-shaft extending to the side of the car. The object in view is the provision of means for connecting the lever on the car with the locking device in such a manner that said connection shall maintain itself in a substantially vertical line between the locking device and the lever; and to this end the whole device consists of a lever mounted on the car, with its inner extremity substantially over or under the locking device of the coupling, to which is attached a rod or device connecting with the locking device, said rod or device being flexibly connected to both the lever and the locking device, and so arranged, as by being slidable in an eye in the device, or an eye in the lever on the car or at any convenient place, as to allow and accommodate itself to all the movements of the coupling or locking device.

TRY-SQUARE.—Emerson S. Farley, Pomona, Cal. No. 563,465. Dated July 7, 1896. The object of this invention is to provide a small, convenient and portable instrument for the purpose of obtaining the bevels most used in all regular-pitched roofs and adapted to be carried about on scaffold-work with ease, requiring no adjustments, being always in readiness without the use of setting mechanism or thumb-screws. The device consists of an ordinary try-square, having on the opposite faces of its blade, levels or scores extending in lines, which converge to the extremity of the inner corner of the handle of the square and representing the bevels of regularly-pitched roofs, and other lines or scores extending diagonally across the blade from the ends of the first-named lines and at right angles thereto, and representing the foot or bottom cuts of the rafter.

ATHLETE'S SUPPORTER. John J. Pfister, of San Francisco, Cal. No. 563,408. Dated July 7, 1896. This is a supporter especially intended for the use of wheelmen. It belongs to that class of supporters having a tight cross band passing between the legs, and is an improvement upon the same inventor's prior patent No. 452,529 of May 19, 1891, the improvement consisting in the means for holding the cross band flat and straight, and preventing it from becoming compressed or drawn into a stringy shape and chafing, as it is liable to do in bicycle riding under the pressure of the saddle and the invariable movement of the legs. The supporter, as a whole, consists of an elastic waistband, a tightly-fitting cross band secured thereto and adapted to pass between the legs, and short annular leg bands secured around their top edges to the lower edges of the waistband and to the adjacent side edges of the cross band, whereby the latter is held flat and smooth.

Commercial Paragraphs

A. F. TOWNSEND, vice-president of the Manhattan Rubber Mfg. Co., of 64 Cortlandt street, New York, has bought from H. G. Blasdel the patents and good will of the Blasdel Jr. Concentrating Belt Co. and will continue the manufacture.

THE Vulcan Iron Works of San Francisco are building a double circular sawmill for McLean Bros. of Redding, Cal., and a portable sawmill for the Red Cap Mining Co. of Hoopa valley; also, a ten-ton ice-making plant for Hawaii and a five-ton refrigerating plant for Central America.

THE Joshua Hendy Machine Works have just issued the fourth edition of their catalogue (No. 3) on "Specialties of Hydraulic Mining Machinery." The catalogue, in addition to the usual hydraulic tables and rules, gives some very practical data from the actual operation of hydraulic elevators. The catalogue will be mailed on application to anyone sending in their address to the Joshua Hendy Co., 42 Fremont St., San Francisco, Cal.

GEORGE W. KNEASS, the well known boat-builder of this city, has recently completed two coffee lighters for Ocos, Central America. They are 46 feet long, 13 feet beam and 6 feet deep. He has also just delivered to the Government life-saving station at this port two life-boats—one self-righting. This establishment has probably built more steam and gas engine launches within the past twenty-five years than all the other builders on the coast. His racing boats, skiffs, yawls, sailboats, yachts and lifeboats may be found upon nearly all the waters of the globe. Wherever the name "Geo. W. Kneass, Builder," is found stamped or branded on the rail or transom of a boat, it means high-grade in all respects. The works and salesrooms are at 718 Third street, with large shops also at the Potrero.

Recently Declared Mining Dividends.

Jackson Mining Co., Eureka district, Nevada, 15 cents per share, payable July 20th.

"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colo.

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Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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If you want to buy or sell a Mine, Mining Properties or Mineral Lands, it will be to your advantage to correspond with or consult

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Operator and Dealer in

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Situated within the Rich Mineral Belt

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From Emigrant Gap, C. P. R. R., distant in a northerly direction by wagon road eight miles, and consisting of nine full claims of 1500x600 feet each; all heavy veins from 2 to 10 feet wide, one 20 feet. One of which is patented; balance possessory title perfect, with sufficient development done upon six of the unpatented claims to entitle owners to patent. But one of the group has been operated by the present owners; this one (the Last Chance) is now being developed and the ore mills from $2.50 to $102.50 per ton, free gold, and has from the start to present time yielded a net profit of 20 per cent over total running expense. CAUSE FOR SELLING—The company has no capital, therefore the property is too large for us to handle satisfactorily. Would sell a part or all; would prefer to sell an undivided one-half. Price $18,000 cash; or for the whole, price $40,000 cash; or would give a working bond, price $60,000, 20 per cent cash. Also three other distinct groups, all situated within the same belt and county, one of which consists of six full claims 1500 by 600 feet, patent applied for; another of four full claims, one patented; and still another of three claims, unpatented, all large, heavy veins. Included in the last named three groups are four mines that were worked quite extensively 25 to 40 years ago and have an A1 record; one yielded an average of over $40, another over $30, and two more over $20 per ton free gold. Will sell one mine, one group or two groups. Will give purchaser pick and choice. This is an unprecedented opportunity for mining men of capital to secure a valuable property at a reasonably small figure. Come and look at it. No triflers or middlemen without positive backing need apply. For further particulars, please address S. B. FOWLER, Maybert, Nevada County, California.

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Dr. J. C. Anthony, of 86 and 87 Chronicle Building, who for the past four years has met with universal success in the cure of Ruptures, now guarantees a cure in from 10 to 16 days. There is no pain, no blood drawn and absoutely without danger. Usually but a single treatment required.

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The Kinkead Quartz Mill will do the work of five stamps with less than half the power, and can be built and put into operation for less than half the cost of stamps. The only wear is the shoe and die, which is less than that of one stamp. The cheapness in first cost and operation of this mill makes it possible to work with profit ores so low in value that they have heretofore been treated as waste. Each mill will crush 10 tons in 24 hours through a 40-mesh screen.

It requires only a 2-horse power Daniel Best Crude Oil Engine, to operate this Mill and one concentrator. Engine and Mill can be set up and running in 48 hours.

Price of Mill $1,000, f. o. b. San Francisco, including Self-Feeder, Ore Hopper, Frame and Foundation Timbers all framed, and one Silver Copper Plate. Weight, 2½ tons; heaviest piece, 1350 pounds.

One ordinary mortar for a 5-stamp battery will weigh more than our whole Mill. This Mill can be made in 300 lb. sections, if desired, at extra cost. Send for Catalogue.

Interior of Four Kinkead Quartz Mill Plant at Virginia City, Nevada, Equal to Twenty Stamps, Crushing Fifty Tons Quartz Daily Average.

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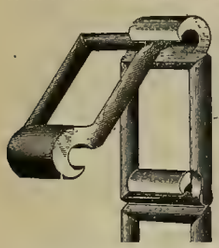

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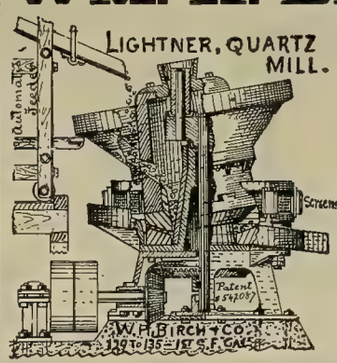

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All kinds of Mining Machinery.

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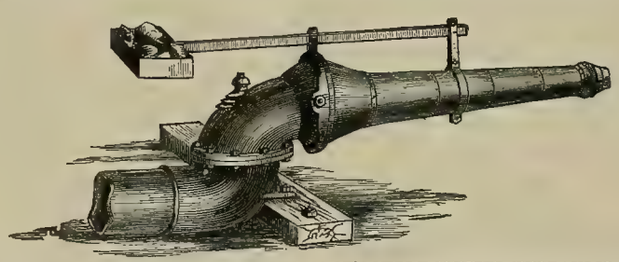

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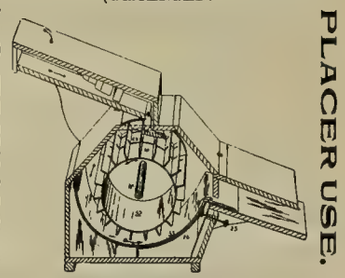
FOR MILL OR PLACER USE.



Greatest GOLD-SAVING MACHINE Ever Invented.

It will come nearer saving every color of free gold than any gold-saving device made up to the present time. Whether the gold is fine, flake or flour, its work is perfect. The only machine that works the black sands of the ocean perfectly, saving the fine flake gold contained therein. Our machines are now running on beach sand and on tailings from some of the best mills in California, and they are working successfully. We give guarantee with each machine. In working over old tailings from a stamp mill that contains free gold, amalgam and quicksilver, this machine has no equal. Send for catalogue and particulars. Manufactured only by the **VICTOR AMALGAMATOR CO., 703 S. Main St., Los Angeles, Cal.**

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GOLD SAVING RIFFLE.

This Riffle is just what placer miners want whether they are working large or small claims, as it is the only riffle ever invented that holds the mercury entirely exposed to the material, no matter what force of water is used. A large number of these Riffles have been sold, and are now in use in Colorado, Montana, New Mexico and elsewhere, and the first complaint has yet to be made against them. Many testimonials have been received from parties who have used and are now using them, giving them the highest praise. Are made of chilled cast iron, cheaper and more durable than any other process. Agents wanted. County and State rights for sale. These Riffles are manufactured at Denver only. Address all orders and communications to

JOSEPH J. PAYNE, Sole Owner,

1710 Champa Street, DENVER, COLORADO.

☞Would sell an interest to right party.

Coast Industrial Notes.

The Custom House at Yuma has been closed.

Sausalito has an electric light plant in operation now.

Santa Rosa and Sonoma, Cal., are to be connected by an electric railway.

There are 900 men employed on Mare Island, and the force will be increased to 1500 by August.

The Union Iron Works will build one of the two Japanese cruisers to be constructed in this country.

—Natural gas is showing increased quantity in the Los Angeles oil wells. At some of the wells it is used for fuel.

No one who employs Chinese can lawfully use the trade mark of the Manufacturers' and Producers' Association.

A townsite, known as Oil City, has been located at the new oil wells nine miles north of Coalinga, Fresno county.

The San Francisco District Land Office reports that during the last half year only six timber land entries were made.

The Santa Fe Co. is extending its tracks from Redondo to San Pedro. The new construction will be about ten miles.

Work is being done at several points on a road which will connect Weaverville, Trinity county, with Eureka, Humboldt county.

—At Summerland, Santa Barbara county, the flow of the oil wells averages about five barrels of a heavy oil to each well daily.

Sonora, Tuolumne Co., is to have an ice plant capable of producing six tons daily and storage for 10,000 cubic feet. Estimated cost, $15,000.

The 129 gold, silver and bronze medals awarded California exhibitors at the recent Atlanta Exposition have been received by the successful exhibitors.

—The two breaks in the Mokelumne and Campo Seco ditch have been repaired and the water turned in again, enabling the mines dependent on it to start up again.

—Suisun is to have a municipal water system. The proposition to issue bonds for $42,000 has been carried and it is intended to have the water in before winter.

—A brewery and ice plant are to be established at Hermosillo, Sonora, by J. H. Schuele of San Antonio, Texas, and A. H. Hoeffer of Clifton, Arizona. About $70,000 is to be invested.

The oil production of California increased from 705,969 barrels in 1894 to 1,208,482 barrels in 1895, an increase of 71 per cent, the largest percentage increase of any of the States of the Union.

The extremely low rates by land and sea between this city and Portland, Or., will end next Tuesday, when the old passenger tariff will be approximated. It is probable freights will follow.

—The assessment roll of Sacramento county shows an increase for the city of Sacramento of $942,071, and a decrease in county outside of the city of $397,036. The total roll amounts to $18,562,075.

—The Mexican consul at this city, A. K. Coney, wants bids for an electric light plant, 600 arc and 1500 incandescent, under an eight years' contract, the contractor to furnish all the apparatus.

—It is proposed to drain the lower Colusa basin—an area of 70,000 acres—by the construction of a canal thirty miles long, from Long Bridge to Knights Landing. The canal is to have a width of a quarter of a mile and a depth of seven feet, giving a flow capacity of 12,000 cubic feet per second, sufficient to clear the basin of the accumulation of hill waters having no direct outlet to the Sacramento river, the local rainfall, seepage and overflow from the river. The cost, exclusive of the cost of land necessarily used, is estimated at $550,000.

—On the 11th the S. P. Co. cut the weekly working time of its 4000 shopmen on the roads west of El Paso to five days, laying them off Saturdays. The cause is stated to be economy, necessitated by decrease in business during the summer months.

—The Washington and Idaho Railway, between Spokane, Wash., and the Coeur d'Alenes, Idaho, 150 miles, was sold under foreclosure at Tekoa, Wash., last Monday, to the reorganization committee of the Oregon Railway and Navigation Company for $1,615,740.

—The success of the Chino beet sugar factory is encouraging the early establishment of additional factories in that locality and elsewhere in the State. Negotiations are said to be nearly complete for the establishment of another factory near the ocean in Los Angeles county.

—The rate war, so far as passenger traffic is concerned, has been temporarily ended by an agreement between the Oregon Railway Co. and the Southern Pacific to advance rates to figures nearly double those of the last ten months, but not as high as before the war started. The railroad is to continue its special train on steamer days.

—The Committee on Management of the Home Products Exposition, to be held in the Mechanics' Pavilion, in this city, Sept. 1st to Oct. 3d, '96, have issued a prospectus of the twenty ninth Industrial Exposition of the Mechanics' Institute, which will be confined exclusively to the products of the Pacific coast, under the auspices of the Mechanics' Institute and the Manufacturers' and Producers' Association of California, which says: "This exposition will differ from any held heretofore, as the display will be confined exclusively to the manufactures and products of the Pacific coast. It is believed that an exposition of purely Pacific coast manufactures and products will result in great good and will be the means of bringing the consumer and manufacturer or producer into closer relationship. There never has been an exposition of this exclusive character held in San Francisco and the great variety and superior quality of a full and complete display of the articles manufactured or produced on this coast will be one that will prove a gratifying surprise to the people. It is intended to make the exposition the most instructive and interesting one of the kind ever held in San Francisco. A special feature will be in making it a vast factory wherein the public can witness the process of manufacture of almost every article exhibited. Looms will be at work making cotton, woolen and silk goods. Machinery will be in operation showing the manufacture of gloves, shoes, ladies', children's and gentlemen's wearing apparel, India rubber goods, jewelry, furniture, electrical appliances, etc. Printing and book binding will be shown, as also the preparation of food products, the making of confectionery, perfumes, extracts, etc., besides which will be displayed marble and stone work, mining, agriculture and dairy machinery, etc. It is expected to make the fine arts display an exceptionally fine one, consisting of paintings in oils and water colors, engravings and etchings, black and white, pen and ink, and other drawings and sculpture. Special efforts will be made to make an exceptional fine display of the works of the citizens of the Pacific coast." Applications for space should be forwarded to Carl H. Clark, agent Mechanics' Institute, 31 Post street, or S. H. Tacy, manager Manufacturers' and Producers' Association, room 2, sixth floor, Mills' building. The pavilion will be open for the reception of exhibits on August 17, 1896. Mechanics' Institute—E. A. Denicke, president; E. P. Heald, rec. secretary. Manufacturers' and Producers' Association—Horace Davis, president; Lewis R. Mead, secretary. Committee on Management—(Mechanics' Institute)—Grove P. Ayers, E. H. Cole, P. J. Healy, Rodney Kendrick, Oscar Lewis (chairman), Geo. R. Presson; (Manufacturers' and Producers' Association)—W. F. Bowers, H. J. Crocker, S. H. Tacy.

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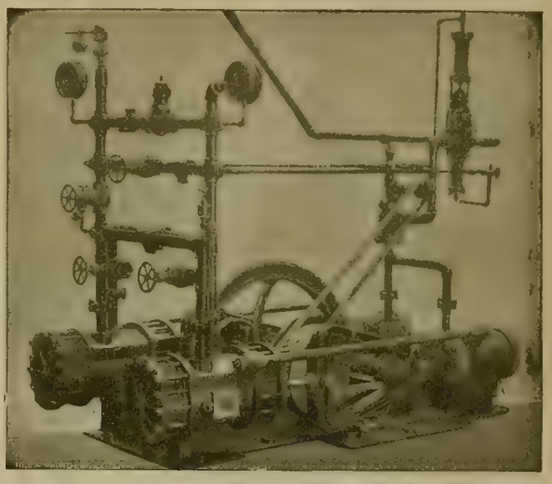
DOUBLE PIPE AIR COMPRESSOR.



This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to PNEUMATIC POWER CO., at 306 Pine St., San Francisco, Cal. We could save you money, though, in cost of foundations, as our Compressors are half the size of other makes.

HOITT'S SCHOOL FOR BOYS

At Burlingame, San Mateo County, Cal., is one of the most thorough, careful and practical "Home Schools" to be found on the Pacific coast. It prepares boys for any university, technical school, or for active business; is accredited at the State and Stanford Universities, and under the able management of Ex-State Superintendent Ira G. Hoitt, Ph. D., ranks among the first schools in the United States.

12

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AT PRICES RANGING FROM

$50,000 to $1,000,000.

Two Going Properties for London.
One " " " Berlin.
One " " " Glasgow.
Two Well Developed Properties for Chicago.
Three " " " " New York.
Two " " " " Ohio.
One " " " " Boston.
Two " " Copper Properties.
One " " Asphaltum Property.
One Nitrate of Soda.

I have first-class clients for property of merit, and can close trade in reasonable time.

J. F. CROSETT,
628 Sacramento Street.....San Francisco.

You Can Get $s for Cents!

CRIPPLE CREEK

Is producing $1,000,000 per month, and the output is steadily increasing and making fortunes for investors in mines and stocks. The CRIPPLE CREEK AND CALIFORNIA GOLD MINING & MILLING COMPANY OF SAN FRANCISCO are rapidly developing their group of mines, located on Little Bull mountain near the city of Victor, in the gold-bearing belt of the greatest gold camp in the world.

A LIMITED NUMBER of the shares of the treasury stock will be sold for the purpose of development at the price of Ten Cents per share. The par value is One Dollar, and under the laws of Colorado are absolutely non-assessable.

For prospectus and full particulars call or address E. B. MYERS, Secretary, Room 30, 139 Post Street, San Francisco.

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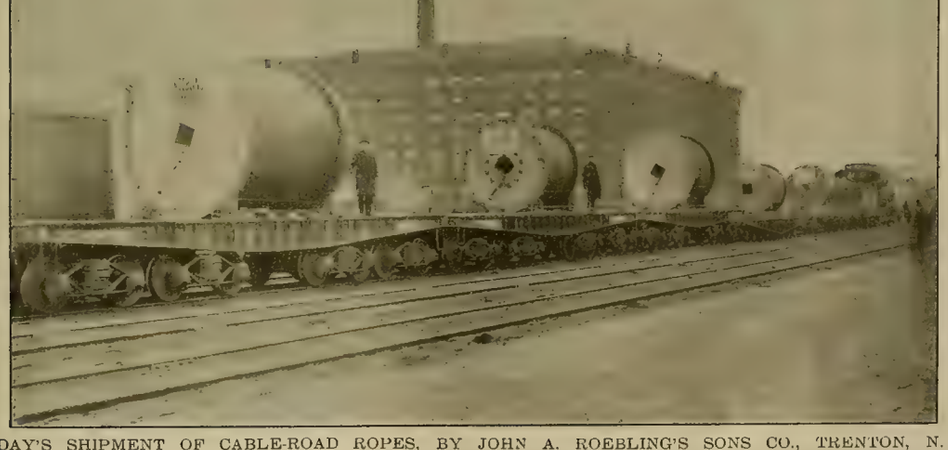

A DAY'S SHIPMENT OF CABLE-ROAD ROPES, BY JOHN A. ROEBLING'S SONS CO., TRENTON, N. J.

THE accompanying illustration gives a good idea of the daily output of an American manufactory where a good deal of "what draws the world together" is made. The firm of John A. Roebling's Sons Co. deserves a high place in mercantile mention in the quality and quantity of wire rope and cables produced, with the world for their market. The main office and works are at Trenton, N. J., employing nearly 2500 men. Mr. S. J. Mooney is in charge of the San Francisco branch at 25-27 Fremont street. The company counts the number of miles of wire rope and wire cable it has made by the tens of thousands, and, as with all forms of fence wire, telegraph wire, etc., its trade mark is a guarantee of reliability. The recent great activity in electrical work has given recognition by practical experience to the high conductive power of the Roebling wire, which has been an important factor in the extension of the electric transportation system in this and other countries.

Mining Summary.

CALIFORNIA.

Amador.

Ledger: The Argonaut shaft, Jackson district, is now 1400 feet deep, without a station or any other excavation. A station will now be cut at 1350 feet, leaving a 30-foot sump, and as soon as the drifts and cross cuts are far enough from the shaft to make working there safe, sinking will be resumed. The first objective point of the Argonaut people will be to reach their north lines and the disputed ground between them and the Kennedy.

Record: At the Central Eureka shaft, at Sutter creek, the water is lowered 350 feet below the mouth of the shaft. For 125 feet the timbers had to be replaced, but from there down they are found to be in perfect condition.

Butte.

Times: The English Syndicate has commenced opening the Wilson mine on Magalia ridge. This mine adjoins the Princess and is known to be very rich.

Calaveras.

Citizen: The Nighthawk mine, situated in San Andreas, has been bonded to C. W. Getchell. Suitable machinery will be erected and work commenced before the 15th instant.

The Marshall gravel mine, situated near the County Hospital, is being operated by Chicago parties. From 15 to 20 men are employed.

Dispatch: The shaft at the Gwin mine is down 1290 feet. A station will be cut at the 1300-foot level and a cross-cut run to the ledge. Sinking will be resumed as soon as the station is completed and continued to the 1450-foot level.

Del Norte.

Journal: In mining circles in this county there is considerable activity. Murray and Christensen have bonded their Low Divide copper claim for $6000. Wenger, Murphy, Darby and others have bonded the old Union mine for $20,000. The tunnel in the Oranna gold quartz claim on Bald Hill is now completed and ore being taken out. The placer claims on French Hill, Craig and Coon creeks, and Rattlesnake Bar, are reported to be paying.

El Dorado.

(Special Correspondence). — Work on the Pocahontas, 8 miles south, is progressing. The shaft has been retimbered and the mill is ready for operation. New hoisting and pumping machinery will be on the ground in a few days.

The Star Light mine, a mile from the Pocahontas, will soon be ready for work. The pipe line and reservoir are finished and the mill nearly so.

On the Lone Star, 5 miles south, drifting from the shaft is showing a fair prospect.

Bryant & Kœrner have located a claim adjoining the Manzinita Queen, 4 miles south of town, and have begun shaft work.

E. Bind and some Eastern capitalists have bonded two claims 8 miles north of Placerville, from Davey & Burton, and are sinking a 300-foot shaft.

Articles of incorporation were filed last week with the County Clerk for the Salisbury Mining Company with a capital stock of $400,000. There are $300,150 subscribed as follows: M. Salisbury, 5 shares; W. H. Crawford, of Chicago, 15,000 shares; Albert W. Longley, of Chicago, 15,000 shares; Chas. F. Irwin and George M. Clark, of Placerville, each 5 shares. The gentlemen named are the directors for the ensuing year.

The tramway on the Boulder mine, 16 miles southwest, is almost finished. It is 1500 feet on the level and 1100 on the incline. It is solidly constructed and topped with steel rails. The 10-stamp mill will be completed and running about the 1st of August.

There is much activity in both gravel and quartz mining in the Fairplay district 25 miles east of Placerville.

El Dorado county's mining properties are beginning to attract attention from abroad. Capital finds a good opportunity here for remunerative investment. A development organization would find this a profitable field. No less than ten capitalists, Californian and Eastern, were in Placerville the past week examining properties in various portions of the county.

Placerville, July 13th, 1896.

Herald: The Zantgraf quartz mine, near Newcastle, has 60 men on the pay roll. The 20-stamp mill runs continually. The four concentrators produce a ton of sulphurets per day.

Nevada.

Union: A quartz mine has been discovered on the McKeon ranch which promises well. The ledge is about 2 feet wide, shows free gold and is heavily mineralized.

C. G. Fisk brought down from Fall Creek a collection of fine nuggets from the Ogdensburg and Laurence mines. They range in size from a hen's egg to a pea and are of all shapes. The mines have been producing handsomely for some time past and the gravel keeps getting richer as progress is made.

Herald: D. Harmon, superintendent reports the California in God's Country running in full blast, but the German in Washington has been shut down for the present. He says they have plenty of ore in German but it is low grade and the expense of mining and milling consumed the profits. It is Mr. Harmon's intention to put in a plant, with power drills, etc., and then he believes he can mine and mill for about $2 per ton.

Union: At the Lone Ridge mine, near Blue Tent, the ledge has been tapped through the tunnel, in about 190 feet. The vein varies from four to five feet in thickness and the rock is of good character.

The *Tidings* says: Can Africa beat it? There are twenty-two gold mines in Grass Valley district that have been worked for forty years—some steadily, others to a depth of 150 to 500 feet, others 900 and 1000 feet and one 2150 feet vertically. This group of gold mines extends from the old Mobile (now the Diana) over to the Cambridge and Lucky mines. What fabulous sums of money have been taken from these mines! Only five are now being worked, and no work has been done on some for twenty to thirty years, as they have been closed for want of capital to go deeper. Capitalists would hardly invest in a gold mine over 400 feet deep in the earlier days, yet this group of gold mines has in forty years yielded over $35,000,000 in gold. Of those closed none stopped because the veins or quartz failed. The ore and veins are there to-day as they were left years ago. The fabulous amount of gold produced shows how rich these mines are. They can and will be worked to a great depth. In depth, permanency and production, South African mines are hardly to be compared to this only one of Nevada county's mining districts.

Placer.

Sentinel: F. Schultz is building a stamp mill on a mine supposed to be an extension of the Herman mine, on Deadwood divide.

The lower tunnel at the Pioneer quartz mine, near Towle, now in 750 feet, will strike the ledge 510 feet below the present working tunnel. Twenty-eight hundred feet of tunnel will be required.

(Special Correspondence). — The Horsehoe Bar Con. M. Co. is building a ditch—capacity of flow 2500 inches—from the north fork of the middle fork of the American river, crossing El Dorado canyon on a bridge, five miles long to the Horseshoe Bar mine. The water will be used under 400 feet head in elevators. A mile of the river channel is kept free of river water by a tunnel run several years since through Horseshoe bend, and the mine is to be worked without the usual winter shut down on account of high water.

At the Gray Eagle mine, Forest Hill, the mining of gravel below the tunnel has been discontinued. A water power hoist and pump are being put in to work the mine through the old incline, through which the first work was done in the channel.

Plumas.

(Special Correspondence).—Greenville, population 250, is in Indian Valley, about twenty-two miles north of Quincy. The principal mines are as follows:

McGill & Standart, G. Standart superintendent, is two and one-half miles south of Greenville. They have two veins which run east and west, pitch north, and are from 4 to 14 feet thick. This mine is worked by three tunnels—No. 1, 600 feet; No. 2, 2000 feet; No. 3, 1300 feet—the present workings being in Nos. 2 and 3. The ore is free milling, and yields about $8 per ton. They have a 15-stamp water power mill, employ 18 men and extract and crush 30 tons of ore daily.

The mine of the Round Valley Con. M. Co., a corporation, is two miles south of Greenville, on North canyon. There are five ledges, three of which are worked. On these ledges there are two tunnels, 500 feet and 1400 feet, both in ore; 200 feet of new tunnel is being run. Only development work will be done this year. They have a 10 stamp water power mill, not running now.

The Hibernian quartz mine, owned by J. O'Toole, leased to B. F. Gullick & Co., is one and one-half miles southeast of Greenville. The ledge bears northwest and southeast and pitches southwest between granite hanging-wall and slate and porphyry footwall. The ledge is a mixture of quartz and porphyry, 26 feet thick. The lessees own a 10-stamp water power mill, one mile from the mine. The mine is being developed through five tunnels, 40, 100, 300, 350 and 450 feet. The ore is very low grade, but there is lots of it. From a mill test of 90 tons it paid $2.50 per ton. Ten men are employed.

The Hibernian Extension mine, No. 1, south of and adjoining the Hibernian, is owned by J. Duncan, C. H. Hook, C. L. Robinson and B. F. Gullic. This mine has two ledges, on which there are three shafts, which show ore averaging 18 inches in thickness. Active work is soon to begin on this mine, which is at present idle.

The Jewel quartz mine, about 600 feet from and parallel with the Hibernian Extension No. 1, is owned by B. F. Gullic & Co. They have a considerable width of low-grade ore that goes about $3 per ton. This mine, at present idle, is to be prospected this fall.

The Alpine quartz mine, owned and managed by B. F. Leete, is one-half a mile southeast of the Hibernian. The ledge runs northwest and southeast and pitches southwest between granite hanging wall and slate and porphyry footwall. The ledge is from 8 inches to 5 feet thick, and pays about $15 per ton. The development consists of a 100-foot shaft with whim hoist and a tunnel now in about 100 feet and in 200 feet more to cut the ledge 100 feet below the present shaft workings. Sixteen men are employed.

Taylorville is another town in Indian Valley, twenty-two miles northeast from Quincy.

The Morton gravel mine, owned and managed by W. B. Morton, is eighteen miles northeast of this place, in what is known as Lights canyon, and consists of forty acres of an ancient channel, worked by hydraulicking. Water is brought in by two miles of ditch and flume and used by one monitor and 800 feet of pipe. The season for mining in this section is short, seldom lasting over the four months, from March 1st to July 1st. There are three or four other companies prospecting in the same vicinity, reports from which are very encouraging.

The Lucky S. gold mine, owned by Mrs. L. Wegener of San Francisco, is eleven miles northeast of Taylorville. J. E. Remick is superintendent. This property consists of four claims and ledges, the general direction of which is north and south. They average about three feet thick. Improvements are a steam hoist and a 5-stamp, water-power mill. A shaft is down nearly 300 feet, and there are several tunnels. The ore runs about seven per cent sulphurets. Nine men are employed, and ten tons of ore mined and milled daily. The superintendent states that mill tests have paid $22.50 and $31.75 per ton.

The Engels copper mine, owned by Engels Bros., is located fourteen miles northeast of Taylorville. This property consists of 3000 feet of lode claimed to be 30 feet in width.

Butte Valley, population 250, is situated about fifty miles northeast of Quincy, near the center of the Dutch Hill mining district. The principal mines in this locality are: The Sunnyside drift gravel mine, two miles south, J. F. Cummings, superintendent. This mine has recently been sold to the Sunnyside Mining Co., a Boston corporation. The ditch, half a mile long, brings water from Clear creek. The gold from this mine is very coarse. At present twenty men are working. The Swiss mine, adjoining the Sunnyside on the north, is also a drift gravel mine, owned and operated by B. Pizzoni, who is working seven men. The Dutch Hill, owned by Savarcool Bros., is a drift gravel mine, two and one-half miles east of Butte Valley. It is developed through two tunnels, one 1200 the other about 800 feet long. Four men are working. In 1877–78 $250,000 is said to have been taken out of this mine.

The Big Flat mines, located three miles east of Butte Valley, are as follows: The Scott, owned by I. E. Scott, a drift gravel mine, is worked through a tunnel, in 250 feet. F. Scott is superintendent and employs seven men. The channel of this mine, like others in this district, is underneath 500 feet of lava.

The Cameron on the same channel, adjoining the Scott on the north, is owned and operated by A. Cameron. At present 13 men are employed but the force is to be increased. The Glazier, owned by A. D. McMillan & Co. is operated by Dr. J. P. Welch, under bond. Six men are employed and the yield is about $5 per day to the man. Crescent Mill, eighteen miles north of Quincy, is a quartz mining locality. The Green Mountain, Geo. P. Cornell superintendent is half a mile west of the town. The principal ledge averages about 20 feet thick. Development is being made through two tunnels; one about a half a mile, and the other nearly a mile long. There is a 60-stamp water power mill on the mine. The ore is low grade and free milling, but there is plenty of it. The Green Mountain has been a large producer but is temporarily idle.

L. P. McC.

National-Bulletin: J. A. Murphy and associates are doing well in their river bar claim on the east branch. They can work the year round.

J. B. Eva and associates have begun prospecting the Golden Gate mine, west of Quincy.

San Diego.

Sentinel: The Owens mine shipped one and a half tons of sulphurets to San Francisco this week.

The mines of the Rice mining district are all being worked, and one of the main things the camp now needs is the building of a mill to handle the ore close at hand.

A strike in the Golden Crown mine, one of the Golden Cross Company's group, is reported.

In the 300-foot stope there is now uncovered, between 7 and 8 feet in thickness and about 40 feet in length, a vein of very rich ore. Selected samples from it assayed $170, and an average sample, taken from top to bottom of face, assayed $58.50.

The indications are that this ore chute crops on the surface some 450 feet from the point where it has been opened in the 300 stope.

Sierra.

Messenger: The hydraulic mine at Eureka cleaned up about 510 ounces, the result of a four months season's run.

Siskiyou.

Journal: At the Mabel mine, on the divide between Oak Bar and Scott Bar, Chamberlain & Timmons are busy making arrangements to erect a mill. The rock heretofore has been crushed in the Columbia mill at Mill creek.

The mines on Thompson creek and vicinity, with the exception of the Seattle Placer Mining Co.'s mine, have been compelled to close down for the want of water.

Work on the Woodland or Garrett mine, on the Klamath, near Scott river, is progressing nicely. Some delay was caused in putting in part of the cribbing, the water being much deeper than was expected.

A number of small river wheels are being built along the Klamath, with which it is intended to elevate water for working rich spots along the banks of the stream.

Some miners on the Klamath river paid $2.50 each a day for the privilege of working with rockers on the mine across the river from the Seattle Placer Mining Co. property. This agreement was soon terminated by the owners, as the men were rocking out $10 a day each.

The owners of the Fort Gough mine, in Scad district, became discouraged and closed down their property. The Wood Bros., who are practical miners, offered to take the mine and work it, giving the owners one-third of the gross proceeds. They made but a short run, as the water gave out, and cleaned up $1875.

Reporter: The Nebraska mine, on Cherry creek, owned by H. B. Warren and Charles Bonhart of Yreka, has been leased to M. F. Means and Thomas Elliott.

Journal: It is reported that F. Beaudry started up a small giant at the head of Wild Cat Creek and in ten days cleaned up about eighteen pounds of gold—nearly $5,000.

Trinity.

Free Press: The Altoona shaft is now 400 feet deep.

Mr. Lawler, superintendent of the Integral mine, has commenced work. He will put 20 to 30 men prospecting and sinking new shafts and developing.

The Strode brothers at Trinity Center are running their 5-stamp quartz mill. A strike has been made in the Bonanza King mine, owned by Vollmers, Fillman & Ellery, and men are at work getting out the ore.

Journal: J. H. Smith exhibited some rock this week in which gold was visible. It came from one of his ledges on Steuart's Fork, which is from 26 to 50 feet in width, on which he is running a tunnel. The rock will average $8 per ton.

Journal: The Altoona Company employ 140 men and 30 are employed by the contractors in getting out wood and timber for the mine. They are putting up new buildings and other improvements. The new furnace and other machinery are to be put in.

At the Nash placer mine, on Coffee creek, the Trinity gold placer mining syndicate are driving a tunnel 8x8 feet and 125 feet in length, to get an outlet and dump for hydraulicking. They are running other drift mines three miles above and employ 40 men.

Tuolumne.

(Special Correspondence). — Considerable mining activity prevails in this district and at Groveland and Big Oak Flat.

At the foot of Priest's Hill the Wheeler Hill Gold Mining Company of Glasgow, Scotland (F. H. Hill, superintendent), is developing on the mother lode.

At the Never Sweat, Captain J. Ballantyne continues taking out the rich rock which was struck just before the 4th.

The Longfellow mine at Big Oak Flat is reported sold to Santa Clara capitalists.

Adjoining the Longfellow is the Mack mine, owned by Mack & Co. of San Francisco. It is one of the oldest mines in the district, having been located in 1854 and worked intermittently since. It is well equipped with a steam hoisting plant and produces ore that mills from $15 to $20 a ton.

At the Two Brothers and Wheeler mines, H. H. Todd, superintendent, work is being done in two of the old tunnels.

The Belcher Gold Mining Co. Ltd. of London, F. H. Hill, superintendent, is preparing to reopen the Belcher mine, about one mile from Groveland.

At Mount Zion, near Groveland, a shaft is being sunk. There are six men employed.

The Slap-jack mine is worked under bond by Argall Bros., Emerson and Griswold. The shaft is down 40 feet on a vein that shows free gold and is said to assay $35 per ton.

Priests, July 13, 1896.

Independent: Messrs. Bluett & Gale, who are mining on leased ground at Jackass Hill, took $540 out of a pocket on Saturday.

C. Fish has sold his interest in the Mapes quartz mine at Yankee Hill to W. L. Wilson. The owners will complete the mill and in two or three weeks begin crushing ore.

Superintendent H. Wilmans of the North Star mine reports the water used in operating the mine as running very low, and that next week the company expect to put in steam for the remainder of the dry season.

Union-Democrat: At the Rawhide the ore coming from the lower or 1000-foot level is milling higher than the average above. The ledge looks stronger and better defined.

At the Jumper the new 20-stamp mill has started up

OREGON.

Tribune: E. P. Jennings, in an interview says, that in the last two years considerable interest has been taken in the Bohemia district, which is about 160 miles south of Portland, in one of the west spurs of the Cascade range. A Wisconsin company put up a 10-stamp mill last fall, and this year they propose to increase the plant by installing a 20-stamp mill, with concentrators and cyanide plant for treating the tailings.

The ore is free milling on top, but soon becomes base with iron pyrites and is easily concentrated. From experiments that have been made it has been found that the ore is easily and cheaply worked by cyanide, and on this fact the future of the district depends, for the ore is low grade, and transportation charges are so high that shipping concentrates is out of the question. The country rock is syenite, and is cut by heavy porphyry dykes carrying the quartz veins, which vary from a few inches to twenty feet in width, and are, as a rule, well mineralized.

The elevation of the camp is about 5000 feet. It is reached by wagon road and trail from Cottage Grove, a station 40 miles distant on the Southern Pacific. The advantages of the country are that it is well wooded and watered, veins good-sized and easily worked, labor and supplies cheap.

The disadvantages are the great amount of snow in winter and the bad roads, which make the freighting of machinery a very serious and expensive undertaking.

WASHINGTON.

Spokesman-Review: The Gold Hill Mining Company was incorporated at Colfax, with $1,500,000 capital stock, for the purpose of developing mines in the Jerome creek mining district.

At the Lone Star and Washington claims, White's camp, the tunnel is now in over 80 feet, for the last 50 feet in high-grade ore, carrying copper, gold and silver, which is of a nature easily treated, either by matting or concentrating.

Outlook: Work has been resumed on the Ivanhoe group of mines on Palmer mountain. It is the intention of the company to extend the shaft to the 200-foot level, and at that depth to determine the value and extent of the ore deposit. On the surface the ledge was rich in native and ruby silver.

BRITISH COLUMBIA.

Advance: Copper mountain lies south of the Similkameen river, and is at the head of a small tributary known as Wolf creek. Upon the mountain are several mineral claims, isolated until the extension of the Columbia and Western Railway is made to Hope. Assays of ore taken from these claims have run up to 37 per cent in copper and $27 per ton in gold.

The veins are between granite and diorite formations, with limestone between. The veins are from a few inches to several feet in width. Development work is being done on the Vancouver by Messrs. Miller and Saunders, the owners. Ore croppings are traceable for 7500 feet and across the ledges for a width in some places of 200 feet.

Journal: On the South Fork of the Quesnelle, the California Consolidated Company have had a successful season's work.

On the North Fork the Cape Horn Dam Company have closed down, waiting for low water so as to replace their dam, which was carried out.

The Meathers, Moore and Black Bear drift properties are being worked and are steady producers. It is reported that they will be consolidated and worked by hydraulicking.

Kootenaian: The Wonderful, near the Slocan Star, upon which work was begun a few weeks ago, has commenced shipping ore from float, the ledge proper having not yet been struck.

Tribune: The following were the ore shipments from Ainsworth during the week ending Thursday, July 2nd:

No 1 mine	to Everett 20 tons concentrates, value	$1100
Sunlight,	to Everett 10 tons ore, value	450
Nonsho	do 10 tons ore, value	300

On the Tuesday Climax, at Rossland, the lead has been traced throughout the length of the claim. A shaft is down 12 feet, in mineralized rock, 2½ feet being solid ore. This claim is 1500 feet west of the Homestake.

An important strike has been made on the Great Western. At a depth of 40 feet in the new shaft a body of chalcopyrite shipping ore, the full width of the shaft, was uncovered.

On the Deadman a strike has been made at the 200-foot level, in a drift to the eastward. The thin streak of ore widened into about 9 feet of vein matter, 4 feet of it galena, assaying 300 oz. silver and $11 gold.

Spokesman-Review: A large ore contract has been signed by which the British Columbia Smelting and Refining Company, of Trail, B. C., are to have the entire output of the War Eagle, Iron Mask, Virginia, and probably the Poorman mines, from July 1 to January 1, 1897, a period of six months. The same company has also contracted for the product of the Crown Point. At this mine there are 300 tons of shipping ore on the dump.

The returns from the first car of ore shipped from the Mayflower mine to the Tacoma smelter have been received at the local office. The ore shipments went $56 a ton, and are the best returns yet made from any property on the south belt.

IDAHO.

Spokesman-Review: D. Rand and two partners cleaned up $4,000 from their placer mine in Pierce City district this season.

At the Kincannon or Granite mine on Granite creek six miles east of Murray, the ledge continues to widen out and the rock grows richer as the exploration is continued. The ore is of much the same nature as that nearer Murray, except that it runs more galena. A pocket was recently discovered from which an assay of a fair sample showed 56 ounces to the ton.

Spokesman-Review: The Hecla, at Burke, is working three shifts sinking its shaft, now down 60 feet. At the 80-foot level a station will be made and three more shifts set to drifting. Good ore is being taken out of the shaft. From the trend of the ledge of the Standard, it is supposed to cross the creek either on the Hecla or the Oreornogo (Ore or no go), both of which ship ore. The Hecla ore is similar to that in the Standard nearer the surface.

The new ore bins of the Standard are still going up. A large bulkhead is being built to hold the rock taken out of the Campbell tunnel. The new tunnel is now in about 2100 feet, about 2700 being required altogether.

UTAH.

The Mercur *Mercury* says of the ore being opened up in the Sacramento mine that the limits of the deposit have not been determined. The new deposit above the old workings is a strong one, and the ore averages from $10 to $20 per ton. Below the main tunnel 45 feet another tunnel is being run, also on a large ore body. The mill is running regularly, saving 85 or 90 per cent. It is the intention of the owners to at least double the capacity of the plant, the changes to be made some time next month or the first of September. At present it takes only fifteen men to operate the mine and mill. The miners break the ore by contract at so much per ton.

The threatened litigation between the Hillside and Sacramento companies, involving a conflict embracing about ten acres between the Hillside, Hillside Nos. 2 and 3, owned by the Hillside Co., and the Excelsior, owned by the Sacramento people, has been compromised, the disputed ground being divided.

Tribune: Advices from the Grasshopper at Marysvale say three feet of ore in the main workings, twelve inches of it going at $75 a ton. The property is being developed through three tunnels at present.

At Mercur, the Sunshine mill is to be enlarged immediately, and the mine output of ore increased to 150 tons daily.

MONTANA.

The *Inter-Mountain*, writing of Butte, says: The eyes of all mining men in this section are at present turned in the direction of the Park Canyon district, which is about two miles east of the city. They are watching the development on the Northwestern Company's ground, which comprises six claims adjoining each other. The company has a bond on these claims and will practically demonstrate whether or not there are large bodies of rich copper-silver ore beneath the capping in that vicinity. The two-compartment shaft through which the Northwestern Company will explore that mineral zone is now down 45 feet and will be sunk 500 feet. The property is situated near the mouth of the canyon and is considered as good as any thereabouts. With the exception of Con Sullivan's Homestake, no great depth has ever been attained on any claim in that neighborhood, and as the surface indications are similar, if not exactly alike, to those of the Anaconda and other great copper properties on this side of the flat, the prospects for opening up a good body of ore in Park canyon are flattering. It would appear as though Silver Bow county is possessed of a mammoth mineral zone shaped like a dumbbell, with the Anaconda hill as one bulb, the Park Canyon hill the other and the ledges crossing the valley the connecting bar. A vast sum of money has already been spent in an endeavor to demonstrate the value of Park canyon, but most of it has been squandered in driving tunnels instead of sinking below the oxidized capping. Another reason why the rich and extensive bodies of ore which are supposed to lie hidden below have not been exposed is the tenacity with which claim owners there have held to their ground. A mining company, as a rule, does not care to take hold of a single claim and chance thousands of dollars in developing it alone, for by so doing owners of adjoining property would be getting something big for nothing. In the case of the Northwestern Company, however, the claims are together.

Inter Mountain: Operations will be resumed at the Potosi Company's property near Pioneer, about 60 miles northwest of Butte. Near the surface the ore is gold-bearing, but as depth is attained a good percentage of copper is obtained. Several tunnels have been driven on the veins, but so located that no depth was reached. The company now proposes to run another tunnel at a point that will give a foot in depth for every foot driven into the hill. The work is to be carried on along the course of the vein about 500 feet.

SOUTH DAKOTA.

Times: C. B. Coon of California has leased the Morton lode, on the Blacktail divide. The Morton is one of the group owned by M. Carroll and has produced a large amount of ore. Several chutes are exposed in workings stopped by influx of water.

The D. and D. smelter has stopped receiving custom ores, excepting from the Bonanza and one or two others with whom the smelter has contracts. There are several thousand tons of ore in the yard, and the management desire to clean up the surplus before receiving any more custom ores. The company will hereafter operate more of its own mines and treat its own ore, having properties that can nearly or quite supply the plant at its full capacity.

Development work on the Yankee Boy property, situated in Carbonate camp, is being steadily carried on. The ore chute recently struck is now 5 feet wide and from 2½ to 3 feet thick. The ore has an average value of $32 per ton.

The new mining camp known as Pringle, on the line of the B. & M. Railroad, is becoming a lively place since the advent of Messrs. Pettibone, Dorrington and associates, who have purchased an interest in the Gray Copper group of mines. The old workings on the property show the vein to be 60 feet wide, 40 feet of which is said to average $108 per ton in gold, silver and copper. Development work will now be pushed. A shaft to be sunk on the vein 100 feet is now under way.

Dacey & Seck, owners of four claims near Ragged Top, adjoining the Murray Madill ground, are gathering up ore from the surface of their claims which has an average value of $76 gold per ton. This float consists of boulders weighing a pound to half a ton.

COLORADO.

Investor: The Nelson tunnel at Creede was started something more than three years ago for drainage and transportation purposes. It is one of the largest tunnels ever projected in Colorado, being 10 feet high by 12 feet wide, with a double track. Its construction was an absolute necessity in order to permit the working of the properties on Bachelor mountain. The Amethyst and United mines have been hoisting 1000 gallons 1000 feet per minute, yet, during a great part of the time, the pumps have not been able to keep the water out of the way sufficiently to permit the working of the lower levels. The tunnel, when completed, will tap the veins 1500 feet below the surface and will save an expense for pumping of more than $1000 per day, and nearly half that amount for hoisting and transportation. It was intended to drive the tunnel 9000 feet farther, in which case all of the more important mines on Bachelor mountain will be drained, but during the past few months the difficulty in securing the money necessary for the expense of the tunnel interfered very materially with the progress of the work, and very little work has been done. As a result of negatiations carried on by B. R. Wallace, Mr. A. B. Overholt secures a large block of the stock of the tunnel company, and will furnish the money necessary for the further prosecution of the work.

Silver Lance: The Inez Gold and Silver Mining Company at Gunnison is making 4 ft. a day advance in its tunnel. It is 47 feet into the contact vein and the hanging wall is still in front of the breast. The company may conclude to drift on this vein, provided it does not find rich ore just under the hanging wall. The nature of the formation is favorable for ore.

Record: The secretary and treasurer of the Union Gold Mining Co. at the annual meeting reported that during the life of the company the gross production has amounted to $362,883.88, of which $232,913.53 has been produced by lessees and the remainder by the company. The production during the past twelve months amounted to $189,540.90, and during the same period $45,615.46 was paid in dividends. The total dividends paid by the company amount to $82,755.37. There still remain in the treasury 83,093 shares and the sum of $7613.19 in the bank, with $12,134.34 due from the smelters for ore. The president's report to the stockholders concludes as follows: "Not more than one-fourth of the ore exposed in the present workings has been extracted, and shipments from the deepest point yet reached show high values."

Mail: The High Five, one of W. S. Stratton's Plymouth Rock group of mines, on Ironcap hill, now being developed by a prospecting tunnel that cuts the formation at right angles just under the wash, is reported to have passed through a vein of good ore, running better than five ounces.

ARIZONA.

Miner: On the Surprise, which lays on the east side of the Agua Fria, the shaft is down 65 feet, the ore body widening with depth. From this shaft 150 sacks of ore that will run $209 to the ton are ready for shipment, and there are about 70 tons more of milling ore on the dump that will run $20 a ton. On the Gold Note, distant about one-half a mile from the Surprise, the shaft is down 80 feet, with a 12-foot crosscut at the bottom, all in ore. Samples assay from $12 to $16 per ton free. These mines lie about forty-five miles southeast of Prescott and four miles east of Bumblebee station.

Sentinel: Mr. Luce and another gentleman purchased the tailings of the old El Rio quartz mill, 5 miles below Yuma, and estimate there are about 800,000 tons. Assays show that they contain $5 in gold per ton. They figure that $1.50 per ton will cover the expense of treating them by the 20-ton cyanide plant they have built.

From Pearce 120,000 pounds of ore daily is sent to El Paso for treatment. About 45 men are at work in the mine.

Oasis: Reports from Congress mine say that from the workings above 700 feet depth, one hundred tons a day are mined and milled, averaging $20 a ton in gold from refractory looking pyritic ores. A cyanide plant is working 100 tons of tailings daily at a profit.

Silver Belt: The Rain Gold claim, owned by E. J. Edwards, a mile and a half from Webster Springs, in Gila county, is making a very promising showing. Fifty feet down, the ledge is strong, with two feet of ore assaying $60 to $70 in gold. B. Round owns a claim on the same lead, on which he has a tunnel 138 feet in ledge matter 40 feet wide which averages $5 per ton in gold.

The *Silver Belt*, writing of the resumption of work in the Old Dominion copper mine, says: The mine is in first-class shape for the production of ore, the various stopes on the several levels looking well, and no difficulty is anticipated in supplying all the ore required when the new furnaces are in operation. A steam sinking pump, with a capacity of about 600 gallons per minute, is now in place in the shaft and everything will be in readiness within a short time to resume sinking. The three-compartment shaft has been completed from the bottom, forty feet below the eighth level, to the surface—440 feet. At present two cages are operated in what were formerly the old compartments. The other compartment furnishes an outlet for the steam and exhaust pipe from the pumps, and it is the intention later to equip this compartment with a counterbalance cage for the transportation of the men, timber and tools. Among the more important of recent additions to the plant are three horizontal tubular boilers, 5x16 feet, installed at the hoisting works, and a new boiler house.

LOWER CALIFORNIA.

H. Johnson, at Socorro, has built a ditch twenty miles long, investing $15,000 in the work, which developed 250 miners' inches. His placer ground will run 60 cents per yard.

MEXICO.

Oasis: The Las Planchas mine, Sonora, continues to improve with extension of the development work. An adit being run to enter the shaft 140 feet down is in good ore all the way, but until it is finished the latter cannot be used below 60 feet. At that depth, however, ore is being extracted and a carload shipped monthly. The mill will be running by August 1st.

Personal.

W. H. STORMS is in Placer county.

JOHN HAYS HAMMOND is in London.

R. H. CAMPBELL is in British Columbia.

PROF. JAS. E. MILLS of Plumas Co. is in Mexico.

E. B. PRESTON of the State Mining Bureau is in Butte county.

SUPT. T. T. THOMAS of the Gwin mine returned from New York last week.

D. M. BURNS has returned from Mexico, where he has been at his Candalaria mine.

H. V. CROLL is now superintendent of the Denver Engineering Works, Denver, Colorado.

R. RECKNAGEL, manager North Pole mine, Baker Co., Or., has returned from London, England, and will build a stamp mill and do considerable development work this season.

GEN. DUFFIELD, head of the Coast Geodetic Survey, has gone to Alaska to gather information regarding the disputed Alaskan boundary. He expects to return to San Francisco in October.

J. H. NEFF, president of the California Miners' Association, has resigned as a member of the State Board of Prison Directors, business requirements making it almost impossible to give that position the time required.

J. MCNALLY, late superintendent of the Virtue mine, Baker City, Or., last week as his last official act brought in $22,000 the result of a twenty days' cleanup. He has turned matters over to his successor, J. B. Risque, and will make his future home in San Francisco.

Assessment Notices.

MARGUERITE GOLD MINING AND MILL CO. Location of principal place of business San Francisco, California. Location of works Yuba and Nevada Placer mines, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 18th day of June, 1896, an assessment No. 1 of Ten Cents (10c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, room 3, 120 Sansome street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of July, 1896, will be delinquent and advertised for sale at public auction and unless payment is made before will be sold on FRIDAY the 28th day of August, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS WINTERS, Secretary.

Office, 325 120 Sansome St., San Francisco, California. Office hours from 10 to 12 M.

BEST AND BELCHER MINING COMPANY. Location of principal place of business San Francisco, California. Location of works Virginia City, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 3d day of July, 1896, an assessment (No. 99) of twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 20, 409 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of August, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 27th day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. J. AFFE, Secretary.

Office, Room No. 53, Nevada block, No. 309 Montgomery street, San Francisco, California.

JAMISON MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, on Little Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 5) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 31st day of August 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of July, 1896, an assessment (No. 4) of Two cents (2c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 38, Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of August, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 21st day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

E. C GODFREY, Secretary.

Office, Room 38 Crocker Building, San Francisco, California.

DELINQUENT SALE NOTICE.

NIMSHEW GOLD MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Nimshew, Butte County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the Fifth (5th) day of June, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
D. Gutman, Trustee	19	500	15 00
D. Gutman, Trustee	20	500	15 00
D. Gutman, Trustee	21	500	15 00
D. Gutman, Trustee	22	250	7 50
D. Gutman, Trustee	23	250	7 50
D. Gutman, Trustee	24	250	7 50
D. Gutman, Trustee	25	250	7 50
D. Gutman, Trustee	26	500	15 00
D. Gutman, Trustee	37	500	15 00
D. Gutman, Trustee	38	500	15 00
D. Gutman, Trustee	53	200	6 00
D. Gutman, Trustee	54	200	6 00
Geo. C. Higgins, Trustee	12	200	6 00
Geo. C. Higgins, Trustee	13	200	6 00
Geo. C. Higgins, Trustee	14	200	6 00
Geo. C Higgins, Trustee	15	200	6 00
Geo. C Higgins, Trustee	16	200	6 00
Geo. C. Higgins, Trustee	71	10,000	300 00
F. P. Burke	32	500	15 00
M. Olsen	85	1,000	30 00
M. Olsen	148	1,000	30 00
M Olsen	149	4 000	120 00
J. M. Fletcher	34	250	7 50
T. Thomson	72	1,000	30 00
T. Thomson	73	1,000	30 00
T. Thomson	135	500	15 00
C. M. Martin	66	500	15 00
C. M. Martin	67	500	15 00
C. M. Martin	68	500	15 00
C. M. Martin	69	500	15 00
S. Gerthrude Symth	70	5,000	150 00
Wm. Matson	122	2,000	60 00
Wm. Matson	142	5,000	150 00

And in accordance with law, and an order from the Board of Directors, made on the 5th day of June, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the company, Mission Street Pier No 1, San Francisco, California, on MONDAY, the 3rd day of August, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

C. D. COOK, Secretary.

Office, Pier 1, Mission Street, San Francisco, California.

ANNUAL MEETING. The regular Annual Meeting of the stockholders of the North Pacific Mining and Transportation Company will be held at the office of the Company room 5, No. 632 Market St., San Francisco, California, on Monday, the seventeenth (17th) day of August, 1896, at the hour of 1 o'clock p. m. for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Wednesday, August 12th, at 3 o'clock p. m.

E. D. PARISH, Secretary.

Office—Room 5, No. 632 Market street, San Francisco, California.

Professional Cards.

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D. B. HUNTLEY,
Mining Engineer and Metallurgist,
TELLURIDE. - COLORADO.

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Having been engaged in the designing and construction of river dredgers for gold saving in New Zealand for some years, is prepared to furnish plans and advice.
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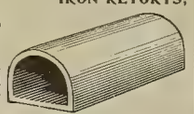

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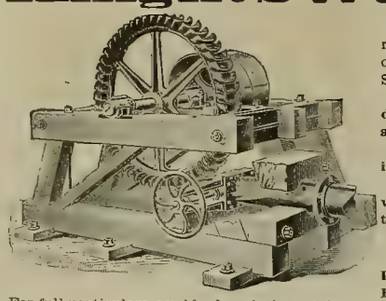

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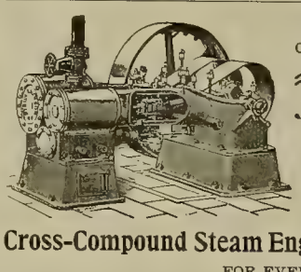

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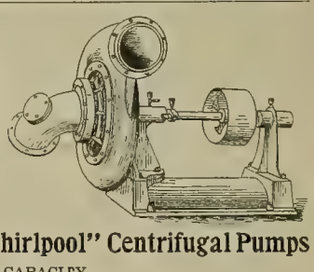

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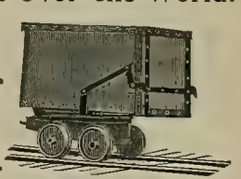

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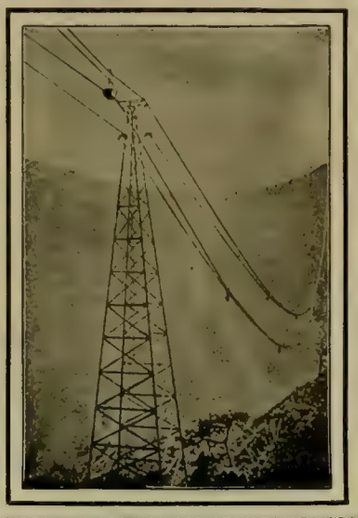

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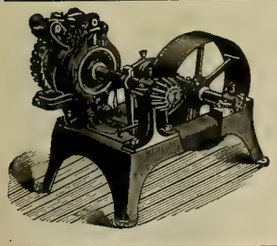

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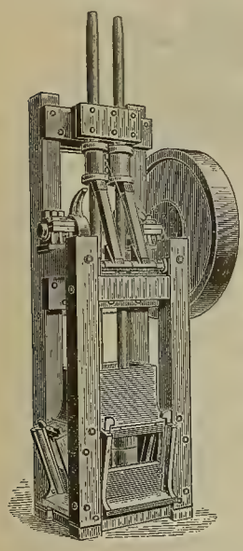

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TRIPLE-DISCHARGE
Two Stamp Mills.

Superior to all other Mills of the same form for the following reasons:

First. Because **Two Stamps** will do **More and Better Work** in a mortar than any other number, as the motion of the stamps causes a discharge at the ends of the mortar, in addition to the front discharge, thereby increasing the stamping capacity, and leaving the pulp of uniform fineness.
Second. They are the cheapest mills to the stamp that were ever offered to miners.
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Fifth. They are more durable, as the framework is secured to the mortar and thoroughly bolted together.
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Seventh. No skilled labor is required to assemble the parts.
Eighth. The discharge is larger in quantity to the stamp, and the number of drops per minute, (110) of the stamp is greater than any other mill.

Weight of Stamps (each).....850 pounds.
Weight of Mill complete.....7500 "
Power required to drive.....5 H. P.

CAPACITY, SIX TO TEN TONS PER DAY.

PRICE, $450.00

Stamp Mills,

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Patented in the United States and Foreign Countries.

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SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.

THIRD: The Large Amount of Space Saved.

Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.

Send for Catalogue and Price List.

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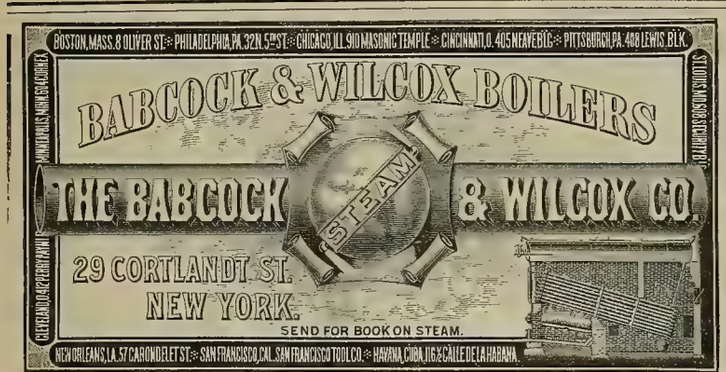
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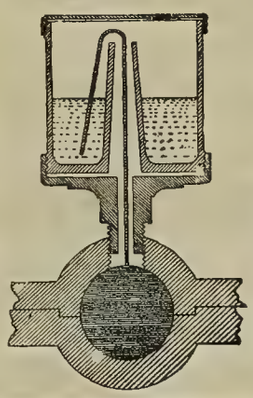

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Frictional vibration by the motion of the shaft against the point of the wire causes the oil to flow, and that this flow is not produced simply by syphonic or capillary action but by frictional vibration is proven by the fact that if the wire does not rest on the shaft then the oil will not flow. When the machinery stops the feed stops, therefore **the Finch Cup is Absolutely Automatic, Feeds Enough Oil and No More, Prevents All Waste, Needs Very Little Attention.**

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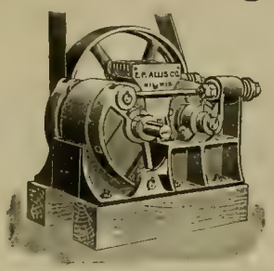

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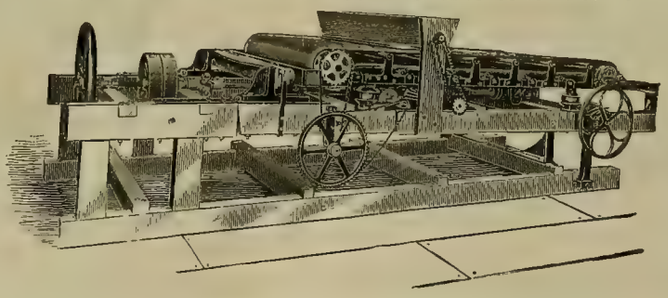
Including prepared canvas belt 4 ft. 6 ins. wide.



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You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
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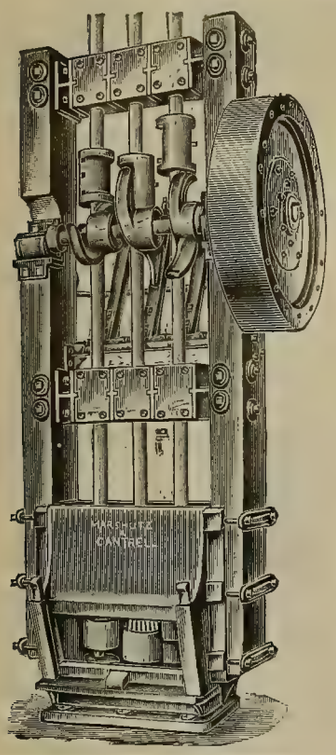

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Saves bill for heavy timbers, millwright and mechanics' labor, and a large amount of space. The term self-contained means a great deal for the mine owner, and can be readily recognized and appreciated in making an estimate for an ordinary plant when the comparative cost is considered.

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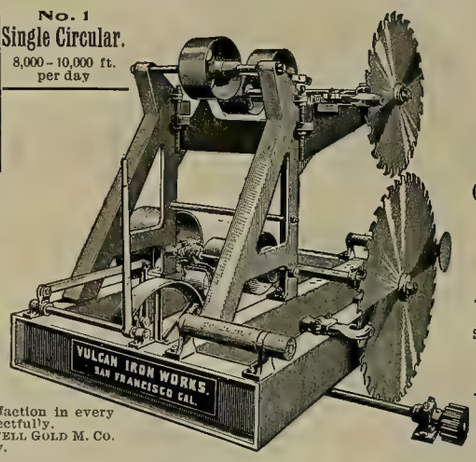

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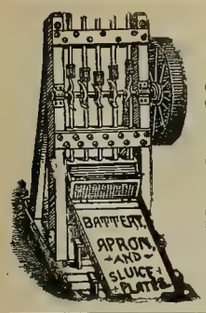

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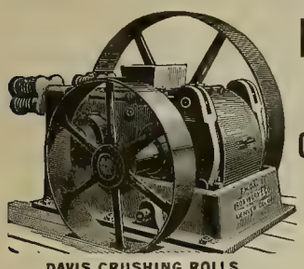

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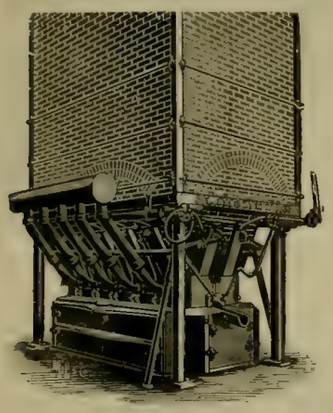

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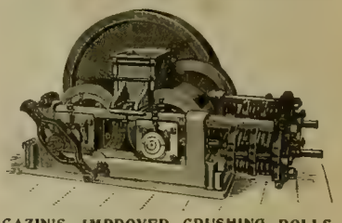

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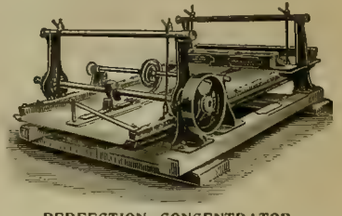

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Doing away with plates on all kinds of mills for saving gold.

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For working the sands from the separating box.

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Works the slimes from the separator.

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To crush to any degree of fineness desired.

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Works cement gravel, without crushing the gravel

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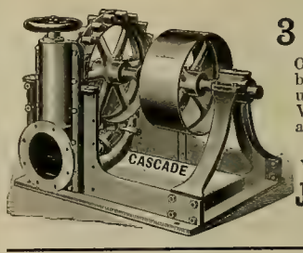

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ESTABLISHED 1863

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Market Reports.

The Markets.

SAN FRANCISCO, July 16, 1896.

The volume of goods going out on orders is large for the season of the year, but the margin of profit is small. The demand is exceptionally large from gold mining districts by reason of a large influx of miners. The call from fruit growing and farming sections in general is about the same as obtains at this season of the year. The prices at which fruits are sold are far from satisfactory. For cereal, dairy product and other farm products the prices average at around last year's figures this month. From the lumbering camps the advices are to the effect that there is a continued fair to good export movement but the home demand is not up to expectation. As a rule manufacturers do not report any particular change in the general situation. Foundrymen and iron workers report a fair degree of activity. Eastern mail advices are to the effect that general business is slow due largely to the presidential election and a growing interest in it combined with the fact that the monetary system of the country seems to be the main issue.

The local money market is essentially unchanged since our last review. Disbursements usual to the month of July are being made. The bulk of these, it is stated, will go into bank for loaning and investment purposes. The statement made that banks and loaners of money are exacting notes payable in gold is, so far as can be learned, wrong, for neither on this coast nor East has there been any departure from the custom heretofore pursued. Eastern money markets are reported fairly easy, with plenty of available funds, but long-time lenders do not wish to extend the time beyond the month of October.

The coinage of silver is to be resumed at the different mints in this country, under instructions from Secretary Carlisle. The outturn is expected to aggregate $3,000,000 a month, and continue the remainder of the calendar year. This action on the part of the Secretary of the Treasury is not due to a change of heart on his part towards the white metal, but to the narrow margin of silver coin available under the Sherman law for the redemption of the so-called Sherman treasury notes, which are retired and canceled when redeemed in silver dollars, and the latter released for general distribution. That silver coin is gaining in favor is witnessed in the amount of these notes that have been redeemed since August, 1893. During the first twelve months ending with August, 1894, the amount that came in for redemption was $4,000,000; the succeeding twelve months they aggregated $8,000,000, and for the ten months ending with June of this year they aggregate $14,000,000. The entire redemption for the two years and ten months since the Sherman law went into effect aggregates $26,000,000, leaving July 1st only $11,217,582 silver coin in the Treasury for redemption purposes. That Secretary Carlisle's decision to have $3,000,000 in silver coined each month to the end of the year does not come any too soon is recognized in the official statement that on January 2nd, 1896, there was held by the Treasury $13,769,608 in silver coin, while on July 1st, 1896, the amount had been reduced to $11,217,582, notwithstanding $7,500,000 had been coined during that period of time. It is doubtful, even with the increased coinage ordered, if the Treasury will be able to add to its reserve silver coin, for it is a well-established fact that the redemption of the Sherman notes is the heaviest during the summer and autumn months. This increase is occasioned by the demand for crop-moving purposes in the Southern and Central Western States, but more particularly in the former, where cotton is the leading production, due, it is said, to the fact that the field hands prefer silver to paper currency.

The Superintendent of Mint's latest estimate regarding the gold output of the world is $220,000,000 with a strong probability that it may go several millions more. The world's production was in 1890, $118,848,700; 1891, $130,650,000; 1892, $146,815,100; 1893, $157,287,600; 1894, $180,626,100; 1895, $203,000,000. The production for the current year, therefore, will aggregate nearly double what it was five years ago. The production of the United States is placed at $54,000,000 for this year which will continue us in the lead as the largest producer of gold. In 1894 Australia was the largest.

New York Silver Prices.

NEW YORK, July 16.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	31½	68⅝
Saturday	31½	68¾
Monday	31 7-16	68⅝
Tuesday	31⅜	68½
Wednesday	31⅜	68⅝
Thursday	31 7-16	68¾

	Copper.	Lead.	Iron.	Tin.
Friday	11 37½	2 97½	11 00@12 50	13 50
Saturday	11 25	2 95	11 00@12 50	13 50
Monday	11 37½	2 90	11 00@12 50	13 50
Tuesday	11 25	2 90	11 00@12 50	13 45
Wednesday	11 25	2 90	11 00@12 50	13 45

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	7½
New York Telegraphic Transfer	.10
London Bankers' 60 days	$4.88
London Merchants	$4.86¼
London Sight Bankers	$4.89½
Refined Silver, peroz., 1000 fine	68¾
Mexican Dollars	54@55c

SILVER.—The market has been quiet, with a downward tendency to Wednesday, when there was a slight advance, with a strong closing reported from New York. Export buyers are said to be more or less indifferent and only enter the market to fill orders. The same condition obtains at New York. The conviction is steadily growing that if the silver convention, to be held at St. Louis next week, endorses either the Democratic nominee or the Populist nominee for President, there will be a strong silver campaign and the market value of the metal be advanced. This view is not only taken by those on this coast who ought to know what is going on in the market, but by those at the East. Whether it can or will be done remains to be seen. The last steamer for China took out $52,500. The aggregate shipments in June foot up $612,885.

MEXICAN DOLLARS.—The market is quiet but steady. The last steamer for China took out 17,813 dollars. The shipments last month aggregate 486,169 dollars.

COPPER.—The market here is fairly steady. At the East the market is slower, with an easier tone, but this usually obtains at this season of the year. It is expected that when the summer and autumn demand sets in prices will be advanced higher than at any time this year. It is stated that the consumptive demand in this country will show a large increase, while abroad the large demand will continue.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The last steamer for Mexican ports took out 101 flasks. For the six months ending with July, 1896, the receipts at this port aggregated 16,089 flasks, and in 1895, 14,181. The exports by sea during that time were, in 1895, 6347 flasks, and 1896, 8547.

The market is quoted as follows:

Home trade, per flask	37 00
Distant points up north	36 25@37 00
West coast of Mexico, for export	34 50

ANTIMONY.—The demand is slow, with the market easy at 7½@8½c in a jobbing way. New York mail advices quote 7⅜@7½c for Cookson's, 6⅝c for Hallett's and 6½c for Japanese, from store.

LEAD.—There is nothing new to report. The market is easy both here and at the East.

Pig, per lb	3 75	@	4 00
Bar	—	@	4 15
Sheet	—	@	5 50
Pipe	—	@	4 75

SHOT.—The market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—The demand is slow, but the market holds steady.

The market is quoted as follows:

Pig, per lb	14½c
Plate, I C coke, heavy, per box	$4 25
" " " light, "	4 10

BORAX.—The market is quoted as follows

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	6⅛
Concentrated, "	5⅝

POWDER.—There is a continued good demand for mining purposes.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

COAL.—Five steamers are to arrive with coal from Japan. A large-sized barkentine, the Theobald, is about due with a cargo of coal from the North Pacific Mining & Transportation Company's mine in Alaska. This company expects to add to its coal fleet in the near future. The market is practically unchanged. The Australian strike is over.

SPOT FROM YARD—PER TON.

Wellington	$7 50@		8 00
Greta	6 00@		6 50
Nanaimo	6 50@		7 00
Gilman	5 50@		6 00
Seattle	5 00@		5 50
Coos Bay	— —@		4 50
Cannel	— —@		8 50
Egg, hard	— —@		11 50
Wallsend	— —@		7 00
Scotch Splint	— —@		7 50
Brymbo	— —@		7 50

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 00	@	10 00
" spot, in bulk	— —	@	11 00
" in sacks	— —	@	12 00
Cumberland	— —	@	— —

LUMBER.—There is a fair home and export demand.

The market is quoted in this city from dock or yards as follows:

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—Jobbers report a fair demand at quotations.

The market is quoted as follows:

Wire, carloads, basis per keg	$3	22½	
" jobbing, " "	3	35	
Cut, carloads, " "	2	97½	
" jobbing, " "	3	10	

Mining Share Market.

SAN FRANCISCO, July 16, 1896.

The market the past week was only moderately active with fair fluctuations under the lead of Chollar. Hale & Norcross has showed more life, owing to active operations having been commenced on the 300-foot Brunswick lode and also an improvement on the 900-foot level Comstock lode. Notwithstanding the market sold down from last Saturday's highest prices, there is a strong conviction with usually well-informed operators that much better prices will be seen within the next 30 or 60 days. While believing this, they say that at any time there is apt to be a slump in prices, which would uncover the weaker margin accounts. While the center of attraction is confined to the work on the Brunswick lode, fluctuations in shares are to be expected, which call for safe-trading and taking of turns so as not to be swamped. That the Brunswick lode has proven richer than the most sanguine had reason to expect before starting active work, yet it is reasonable to assert that it does not warrant high prices, or even as high as are now current, except on a gamble. If mining men's expectations are realized, then much better figures ought to rule. While attention is given to the work on the Brunswick lode, that on the Comstock lode should not be overlooked, for at several points it is of an interesting and important character. Still, traders do not take so lively an interest in the latter lode as in the former, owing to one having been worked over for years while the other is new and therefore an unsolved problem. Shares of the mines in the Bodie district have shown more strength under light trading. This is due largely to the leading mines being under one management, better and more concise weekly reports and also more active work.

The news from the Comstock mines is to the effect that more exploiting is being done by several, while in some of the others dead work is nearing completion. So far as official letters go, there has not been an increase the past week in the working forces of the men employed, but additions are expected to be made by several of the companies within the next two or three weeks. In Alta they are still prospecting on the 725-foot and 825-foot levels, with, as yet, nothing new to report. In the Gold Hill mines they are raising a few tons of ore in Overman while prosecuting work heretofore reported by us. Seg. Belcher and Belcher have resumed extracting ore. The former raised the past week about 27 tons, assaying over $29 to the ton, while Belcher raised 80 tons, assaying about $26 a ton. This is an increase in the number of tons extracted and raised, and also in its assay value. In Crown Point active work is under way on several levels. So far as the information given in the superintendent's letter goes there is nothing encouraging to dealers looking for immediate good results. The work points to more time, yet no one can tell what a day is liable to bring forth. No report of work comes to hand from Kentuck or Yellow Jacket. It is expected that after the current week there will be a change for the better in the latter mine—more men put to work, which, if done, will call for an assessment. They are still raising in Confidence for air connection. Work is continued in the long west cross drift run jointly by Challenge, Confidence and Con. Imperial. It was driven 14 feet the past week. In Alpha they are still driving ahead the southwest cross drift on the 500-foot level. In Bullion there is nothing new to report. Best & Belcher and Gould & Curry report repairing the Bonner shaft. In Con. Virginia they are pushing work on the 1000-foot, 1650-foot and 1750-foot levels. Only 75 tons of ore were raised the past week. The car samples assayed over $54 a ton. At last advices they were still engaged in putting out the fire and purifying the air in the old Bonanza workings. This part of the mine will soon be as safe as any other portion. Work is continued on the Central Tunnel level, and also 1000-foot level of Ophir. This work is being closely watched, as is that in Mexican on the 1000-foot level. In Union they are working on the 900-foot level of the Sierra Nevada and Union shaft. In the Sierra Nevada they are still at work on the Layton tunnel level. In Utah and Andes the work is on the same levels heretofore reported by us.

Our advices from the Brunswick lode are of the most encouraging character. In Occidental there has been an improvement on the 650-foot level. Active exploiting work is continued on the 550 foot and 750-foot levels. In Chollar, on the 300-foot level, work was suspended from Saturday to Wednesday so as to make some needed repairs. It is expected that within a few days they will strike the downward continuation of the ore found on the 200-foot level. In Hale & Norcross active work has been resumed. Considerable confidence is expressed in the outcome. The work under way in Gould & Curry is being closely watched, as is that in Savage, but from the former the best result is confidently looked for by mining men. The shaft in the Best & Belcher is being steadily sunk. From all that can be learned, it looks as if more active times are near at hand.

From the Bodie district our advices are to the effect that in the Standard mine they are working on several levels, but the ore veins are narrow and the assays around $12. In Bodie they are sinking a winze on the Fortuna vein below the 550-foot level. They were at last accounts in a four-inch vein of high-grade gold ore. In Bulwer active work is continued on several levels. A few tons of fair-grade ore are raised each week. In Mono the work is essentially unchanged.

The following illustrates the changes of the week:

Mines.	July 9.	July 16.
Alpha	$ 13	....
Alta Consolidated	10	....
Andes	32	$ 35
Belcher	50	38
Best & Belcher	77	70
Bodie	40	43
Bullion	21	....
Challenge	....	39
Chollar	2 50	2 60
Confidence	....	....
Consolidated California and Virginia	1 90	1 80
Consolidated New York	....	....
Crown Point	53	48
Exchequer	....	....
Gould & Curry	98	88
Hale & Norcross	1 85	1 50
Justice	....	....
Mexican	65	62
Ophir	1 45	1 05
Overman	19	....
Potosi	1 20	1 25
Savage	86	80
Sierra Nevada	....	60
Union	51	51
Utah	12	11
Yellow Jacket	43	....

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied, Deling't and Sale.	Secretary.
Best & Belcher M Co, Nev	60	25c	July 2..Aug 6..Aug 27	M Jaffe, 309 Montgomery
Bullion Con G M Co, Cal	8	15c	June 16..July 20..Aug 11	C A Grow, Mills Building
Central Eureka M Co, Cal	1	3c	May 16..June 22..July 18	W Van Bokkelen, 320 Sansome
Channel Bend M Co, Cal	3	5c	June 23..July 31..Aug 22	J P Langhorne, 39 Sutter
Chollar M Co, Nev	42	25c	June 9..July 14..Aug 4	C E Elliot, 309 Montgomery
Gold Bar Con M Co, Cal	4	2c	July 13..Aug 20..Sept 21	E C Godfrey, Crocker Bldg
Jamison M Co, Cal	8	5c	July 6..Aug 15..Aug 31	Sam W Cheyney, 120 Sutter
Kentuck Con, Nev	12	5c	June 16..July 22..Aug 12	Aug Waterman, 309 Montgomery
Marguerite G M & M Co, Cal	3	10c	June 18..July 28..Aug 28	Chas. Winters, 237 Twelfth
Mono G M Co, Cal	37	10c	June 2..July 6..July 27	M E Willis, 309 Montgomery
Mt Diablo M & M Co, Nev	4	5c	May 21..July 2..July 23	R W Heath, 318 Pine
Nimshew G M Co, Cal	1	3c	June 5..July 13..Aug 3	C D Cook, Mission St Pier No. 1
Occidental Con M Co, Nev	23	15c	June 2..July 7..July 28	A K Durbrow, 309 Montgomery
Old Flag M Co, Cal	3	2c	May 11..June 18..July 20	F L Olmsted, 315 Montgomery
Reward G M Co, Cal	13	3c	June 1..July 2..July 20	S W Backus, Mills Bldg

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Lady Washington Con Co	J E Jacobus, 309 Montgomery	July 29
North Pacific Mining & Transportation Co.	E D Farish, 632 Market	Aug 17

San Francisco Stock Board Sales.

SAN FRANCISCO, July 16, 1896

9:30 A. M. SESSION.

200 Andes	35	200 Mono	20
100 Caledonia	11	100 Occidental	91
200 Challenge	39	500 Potosi	1 25
100	38	200 Sierra Nevada	60
200 Chollar	2 60	100 Savage	79
300 Gould & Curry	88	50	80
50 H. & N	1 45	100 Union	51
50	1 50	200 Utah	11

SECOND SESSION—2:30 P. M.

100 Ophir	1 05	300	46
250 Mexican	62	200 Belcher	38
100 Gould & Curry	84	50 Sierra Nevada	56
200 Best & Belcher	70	50 Union	50
100 Con Cal & Va	1 80	100 Utah	11
200 Savage	77	100	10
150	78	200 Challenge	35
550 Chollar	2 55	100 Bodie	43
200 Potosi	1 15	100 Bulwer	29
200 Crown Point	48		

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THE CALIFORNIA DEBRIS COMMISSION having received applications from the following persons to mine by the hydraulic process, viz.: In El Dorado County: John J. Flora, in the Buckeye Hill Mine, near Volcanoville, to deposit tailings in Buckeye Canyon; Giacomo Varozza, in the Try Again Mine, near Placerville, to deposit tailings in a ravine below the mine; Giovanni Raffetto, in the Raffetto Mine, near Placerville, to deposit tailings in South Weber Creek; J. R. Vandergrift, in the Maylone Mine near Indian Diggings to deposit tailings in Indian Diggings Creek. In Tuolumne County: F. W. Eaton, in the Cook Gravel Mine, near Montezuma, to deposit tailings in State Gulch, A. P. Scheld, in the Marlow Mine, near Sonora, to deposit tailings in Turn Back Creek. In Nevada County: Eber A. Sanford, in the Deer Creek Mine, near Moo ey's Flat, to deposit tailings in an old pit. In Plumas County: California Gold Mining and Investment Co., in their claim, near Taylorville, to deposit tailings in Foreman Canyon; Henry W. Orr, in the Slate Creek Mine, near Spanish Ranch, to deposit tailings in the Hartley Fork of Slate Creek. In Placer County: Barney Cavanaugh, in the Parrice and Brown Mine near Bull Mountain, to deposit tailings in a ravine; Shirley Mining Co., in the Shirley Gravel Mine, near Michigan Bluff, to deposit tailings in Dutch Gulch and Poor Man's Creek; and William Phillips, in the Phillips Claim, near Colfax, to deposit tailings in Dry Creek—gives notice that a meeting will be held at Room 58, Flood Building, San Francisco, Cal., on July 20th, 1896, at 1:30 P. M.

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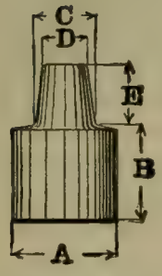

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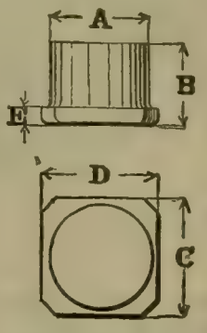

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The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis. The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem so favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City.

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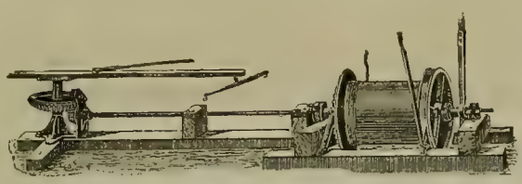

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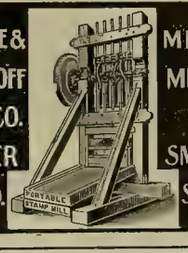

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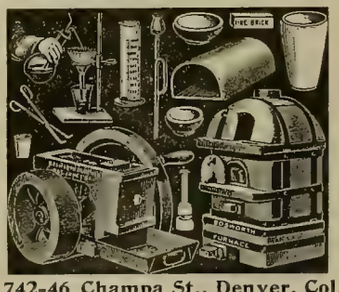

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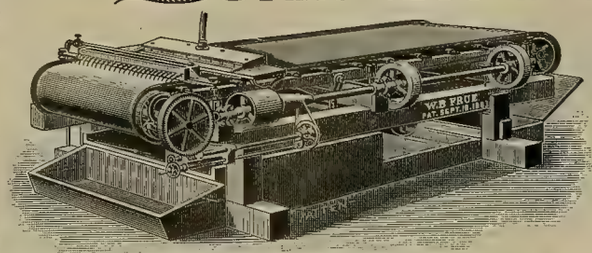

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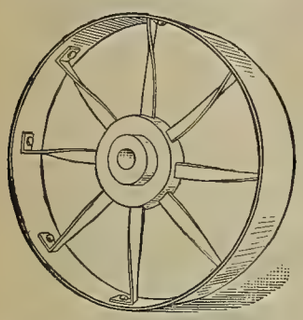

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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1881.—VOLUME LXXIII. Number 4. SAN FRANCISCO, SATURDAY, JULY 25, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

A Hydraulic Grapple.

Some attention having been directed to a contrivance now in successful use in hydraulic mining in southern Oregon, a photograph of the machine in action was recently secured, from which the accompanying illustration was engraved. The cut represents the grapple swinging a load of small boulders out from the bank.

The grapple, as constructed by Wm. Knox, Jacksonville, Oregon, consists of a cast-iron water cylinder, on which are fastened, by bolts, five T iron straps, with sockets on their lower ends, supporting a wrought-iron ring, which forms the fulcrum or pivotal point of the ten T iron claws that grapple and sustain the load. Within the cylinder is a piston with rod attached, on the lower end of which are fastened ten links, which connect the claws with the piston, so that, by the downward movement of the piston, the claws are made to open and the upward movement causes them to close. The machine is suspended on the boom of a crane or derrick. The power operating the machine, in this case, is taken from the water pipe operating the derrick, and conveyed in 1½-inch pipe to the base of the derrick mast, where a short line of rubber hose is used to admit of the swing or turn of the derrick. The water then passes through a double system of pipe and hose line, fastened on the boom, with suitable valves for controlling its inward and outward flow to the grapple, held in suspension, so that by passing the water under pressure, through the one pipe on to the piston within the cylinder, the claws are made to open; and by reversing the lever, it is made to enter the other side of the chamber and the claws are made to close, the outlet discharging at the base of the mast in either case through the same pipe in which it enters the chamber. The double outlet pipes are drawn together, forming but one outlet, on which is placed a stop cock, which is used to stop the discharge at any time, enabling the operator to open the grapple to any desired size. It is under the control of the engineer at the base of the derrick mast, sixty feet from the machine. With the levers he can pick up any boulder, stump or object within the radius of the boom's length and deposit and stack it, if necessary, 20 feet high upon the bedrock.

This machine is of value to the hydraulic miner, making it possible to work at a profit ground where it is necessary to handle large boulders, heavy tailings, stumps, etc. It is in present operation at the Squaw Lakes mines, Jackson Co., Oregon, handling boulders from one to six feet in diameter and removing large tree stumps, roots and logs, without the use of powder or extra labor. It can be operated with either water or air under pressure or by steam.

HYDRAULIC GRAPPLE, SQUAW LAKE, JACKSON CO., OR., SWINGING FROM BANK WITH LOAD OF SMALL BOULDERS.

Timbering in Drift Mines.

The system of timbering in use depends very largely on the conditions under which the pay gravel is removed. As a rule, a less amount of timbering is employed than formerly. The timber employed, where it can be had, consists preferably of second growth spruce, or more properly red fir, from 10 to 16 inches in diameter. Where this is not available, the second growth yellow pine is frequently used. The logs are stripped of bark and brought to the timber yard of the mine, there being cut into such lengths as are needed from time to time. Where second growth trees cannot be had the large spruce trees are sawed into logs the usual length of timber required, barked and split into two or more sticks roughly squaring from 8 to 16 inches as the requirement of the mine may call for. Lagging are split out of spruce logs six feet long in rough slabs 2 by 6 inches. Wedges are made out of the same material, usually the timber waste in the mine timber yard. Timbers bought by contract are ordinarily paid for by the running foot; lagging and wedges by the one thousand.

In the large mines, where the roof of the breasts is so little cemented and coherent that caves are liable to occur, the timbering is kept close up to the working face. Formerly it was the almost invariable rule to have the caps run from post to post and lag overhead closely. Now the ordinary custom is to set a cap over a post in "T" shape, wedging it tightly to the roof. Not as many posts or caps are required and the use of lagging is materially cut down. The aim of the miner now is merely to keep the roof up at the working face while working at it. The mined-out ground is allowed, and it might be said encouraged, to cave down on the waste boulders that are piled back among the timbers. It has been practically found that the danger of caving is in many mines due to the air slaking of the roof, and that this requires time, enough to admit of the face being advanced the distance apart of the timber sets without supporting the roof. The main tunnel and gangways through this class of ground, however, have to be timbered carefully with a view to comparative permanence and ample pillar protection is left.

In mines where the roof is cemented gravel or lava, posts alone or posts and caps as above are employed, the distribution being controlled by the judgment of the foreman, the idea being to hold the ground only while working in it, and that when it does cave, the timbering shall be sufficient to keep the cave from extending to the breast or working openings. No close regularity of distance apart is observed as in soft ground where timbers are placed at uniform distances. Main tunnels and gangways in this hard cemented roof ground are timbered with a view to permanence, and more care than in the breasts is observed in piling the waste rock. The leaving of pillar protection is rarely necessary.

The cost of timbering by the changes of practice is much reduced. Conditions vary between such extremes that averages are misleading. The maximum cost rarely reaches over four or five cents to the ton carload.

A DECISION of importance in its bearing on the status of the water rights of the power companies that are utilizing mountain streams by electric transmission plants has been rendered by Judge Van Dyke of Los Angeles, in the case Mayberry vs. Alhambra Addition Water Co. The essence of the decision in this respect is in the declaration that the developers of water increasing the flow of the streams are entitled to that increased flow even after it has apparently passed from their control—that is, beyond the point of their primary use. The court recognizes the right of unobstructed recovery of this water by the developers unless voluntarily abandoned. While the decision comes from litigation growing out of the practice in southern California of developing the subterranean flow of the streams with porous beds by building dams from the impervious strata beneath, thus raising the flow to the surface, it logically is applicable to reservoir waters that are used in power development or any other primary purpose and then turned into natural stream channels. By this flow in natural channels developed waters do not become subject to riparian control.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, July 25, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Hydraulic Grapple, Squaw Lake, Jackson Co., Or., Swinging from Bank with Load of Small Boulders, 65. The Dodge Mill, 71.

EDITORIAL.—A Hydraulic Grapple; Timbering in Drift Mines; An Important Decision, 65. What Is "Rock in Place?" Of Present Local Interest; A Mining Exhibit at the Mechanics' Fair, 66.

SCIENTIFIC PROGRESS.—How Electricity Manifests Itself and What It Can Do; The Bolometer; Amalgams of Chromium and Mercury, 69.

ELECTRICAL PROGRESS.—Artificial Sunshine; Electrical Hardening of Steel; Electricity Under Which Energy Becomes Appreciable; Storage Battery Roads in Europe; A New Storage Battery for Locomotive Purposes, 70.

MECHANICAL PROGRESS.—Changes by Punching; Steel Shafts; Shears for Cutting Off Iron and Steel; A Substance Harder than the Diamond; To Temper Reamers and Taps, 71.

PRACTICAL INFORMATION.—Iron Ore in Mexico; A Comparison of the Losses of Heat; To Cast Aluminum Bronze; The Flow of Petroleum in Oil Wells; Electric Lighting the Safest of All Illuminants; How Much Water to Drink, 70.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 74-75.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 82.

MISCELLANEOUS.—Concentrates, 67. The Gold Belt of Gunnison County, Colorado; Power of Sulphate of Zinc; Locating Mining Claims; Aluminum Bars and Rods; Per Capita of Gold Money in the United States; A New National Park at Wyoming, 68. California Mines and Miners, 69. The Dodge Improved Mill; Rock Drilling Contests at the State Fair in September, 71. Coast Industrial Notes: Personal; Recently Declared Mining Dividends; Commercial Paragraphs; Recent California Mining Incorporations, 76. Notices of Recent Patents, 83.

What is "Rock in Place"?

A recent decision by Chief Justice Davie of the Supreme Court of British Columbia has occasioned considerable discussion among mining men and experts and is being quite generally criticized by them. Without quoting the full text of the decision, the essence of it is in the declaration that "rock in place" is "mineral in place"—to which there is no dissent, since the term, though not literally accurate to the language employed, has grown into use from a colloquism—and that "mineral in place" is not mineral in country rock, but "mineral between definable rock walls." This last being indifferently, in colloquial speech and even English as she is written, ledge, lode or vein, the Chief Justice holds that "rock in place" is practically synonymous with "vein" or "lode" and that "rock in place" means a "substance defined between some definite walls or boundaries."

The question of the exact technical meaning of these several terms is not a new one. It has been on the surface of the terminology of the technical expression of the mining industry ever since the discoverers of mineral, where it ought not to be according to Van Cotta and his followers, have been building up new theories to fit the entire range of observed facts, not the portion of them first known. The terminology we use for definition is simply a survival maintained by the conservatism which would make new facts fit old theories regardless, instead of making new theories to fit the new facts.

Rock in place did mean a quarter of a century ago substantially what the chief justice decides it does now, but mineralized country rock was not known then. Its discovery and the knowledge we have of its formation justify the abandonment of the old definitions as not fitting the conditions. In some knowable cases they will fail. They should be cheerfully abandoned with the abandonment of the erroneous interpretation of nature that they defined. In place of the old definitions make new ones. R. L. Dunn, in a paper entitled "The Genesis of Placer Gold," published in this paper in October, 1894, made this distinction between lode deposits and placers—a lode [rock in place], he says, "is a mineral bearing deposit in which the presence of the mineral is due to the operation of chemical forces alone, and is the place of primary deposit; and a placer is a mineral-bearing deposit in which the presence of the mineral is due to the operation of the mechanical forces of nature acting on the lode deposits defined above, and in reference to them secondary." This definition has the essential merit of a simplicity that makes the argument of any supposable case impossible. The evidences of origin in a very few known cases are so obscure as to cause differences of opinion even between mining experts. Its use would tend to clarify mining law and its interpretation. The latter at present seems to be guided by the opinions of witnesses, who, no matter how expert in mining, are, as a rule, the reverse in knowledge of the meaning of words.

Chief Justice Davie based his decision on the opinion of one of the witnesses, testifying as to what he thought was the meaning of the term "rock in place." Accepting the definition suggested, the witness would only have had to testify in answer to the question: "Was the presence of the mineral due to chemical forces alone, or had natural mechanical forces removed it from its original place of deposit?"

Of Present Local Interest.

Some suggestions of advisable action to be taken by the owners of mining claims on the odd sections of the railroad grants, to protect their claims against being patented to the railroad, pending the possible action of Congress this coming winter, appeared in the last number of the MINING AND SCIENTIFIC PRESS. In continuance of these suggestions, mine claimants taking the suggested action would likely find an unavoidable delay in the first step—the approval of the survey by the Surveyor-General, in consequence of the accumulation of the surveys in his office awaiting action. The work of examination cannot be hurried. This delay being inevitable, to provide against its effect, on the survey being completed by the Deputy, a certified copy of his plat and official report, a certified copy of his order of survey, and an affidavit of claimant reciting the facts—that is, the application of the railroad to patent the land, the unavoidable delay which might deprive claimant of his rights if he awaited the regular order of action through the Surveyor-General's office, the facts of his occupancy of the claimed mining ground—should be made the basis of an application to the Land Office for the issuance of the citation for the railroad to appear and show cause why the railroad filing should not be cancelled. The Land Department will certainly respect the sworn reports of its own officers—the Deputy Mineral Surveyors—rendered in the performance of their official duties. If for any reason it does not, the foundation is laid for an appeal to the courts for summary relief, which will delay the issuance of the railroad patent, if nothing more, to the extent that time may be gained giving Congress opportunity to act.

Beyond the protection of the actually vested rights of individuals, the inspiration of the preceding, there are the areas of mineral land unclaimed at present, but which undoubtedly contain gold, undiscovered, but nevertheless existent. It is these lands that the Mineral Land Committee of the State Miners' Association should be fighting for. The opportunities for this are not nearly as absent as has been asserted in the daily press. In fact, the way is cleared for protests that will have to be considered on their merits. The rulings made by the Land Department on protests that have been refused, say as well what the form and matter of a protest should be to receive favorable consideration. The blanket protest has been dismissed on logical grounds; the requirement has been insisted on that the protest must be specific. The Mineral Land Committee should then see to it that specific protests are made. The examination of all of the lands by forty-acre tracts for this form of protest would undoubtedly be beyond its resources, though no such enormous sum as has been claimed. But there is no necessity of examining all the forty-acre tracts. An examination of the lists by the resident surveyors and miners would eliminate safely half, possibly two-thirds, of the listed area as being fairly non-mineral—that is, having on it no mining claims, and its geology such that the absence of mineral deposits could be safely inferred. As to the remainder of the land, the geological character and locus of which is such that the existence of mineral can be reasonably inferred, even if undiscovered, these same resident surveyors and mining engineers could protest on all or part, as far as each one's personal knowledge extends, from their personal knowledge without making examination of the ground specially for the purpose. These protests, costing but a nominal amount, could be made meeting the requirements of the Department, and would certainly be effective in delaying the patenting to the point that Congress might have time to act.

The railroad should have the non-mineral lands, independent of their being of agricultural value or not; but the mineral lands once in their possession, and the extension of the only free industry, gold mining would be restricted for years to come. The railroad, all through their contest for these lands, has insisted that "mineral land" meant "mines," and mines in a most restricted sense, meaning mines that not only produced gold, but produced it at a profit. They have seemingly impressed this construction on the Land Department despite Supreme Court decisions that make a clear distinction. There is a point in this that should not be overlooked in the preparation of protests. Mineral land is not necessarily mines; it has a wider significance. It is land in which the prospects are such that a working miner would be willing to spend his time and money on it looking for mines. Would it not be well for the Mineral Land Committee to consider these suggestions as to economical protests to gain time, if nothing more substantial directly?

A Mining Exhibit at the Mechanics' Fair.

The managers of the Mechanics' Fair in San Francisco this fall are making a creditable innovation in limiting exhibits to Pacific coast products and manufactures. There has been as yet no move to make a mining exhibit on the part of California mining men, nor is there any prestige to be given the industry by an exhibit on the customary lines, exhibits of mining appliances and machinery of course excepted. These latter are instructive and appreciated, and the business interests of inventors and manufacturers can be depended on to make this class of exhibit a prominent feature of the Fair.

Something is needed, however, to take the place of the exhibits of selected specimen ores and rocks which, to the average man not a miner, are meaningless. True they contain gold, silver, copper or whatever it may be; but aside from that fact, which must be and is only accepted on hearsay by our average man, he learns nothing. What is needed is something more comprehensive and concrete, that can instruct directly through the eye of the observer. To accomplish this, we suggest that a reproduction of the mother lode in its extent through the several counties be made in glass, showing the topography of the surface, the towns, the mother lode system of veins and the mines and mills. The Mining Bureau has two views in glass of single mines that illustrate what would be required. Of necessity, minor details of the mines could not be reproduced and a certain amount of distortion would be essential. Nevertheless, a far more comprehensive idea could be had of the mother lode and of the gold quartz mining industry from this reproduction than could be gained in any other way. Particularly striking, too, will be the relation between the developed portion of the lode and the undeveloped portion. Indeed, in this last particular it will be educational to experts even.

The same reproduction of a placer lead would be equally instructive. For this purpose a reproduction of a portion of the Forest Hill Divide is suggested—either that district around Forest Hill that includes the Mayflower and Paragon mines or the district taking in the Hidden Treasure, Red Point and Eureka Consolidated. The latter could include the Pioneer and Herman quartz mines as well. Either of these districts—and they are suggested for that reason—are accurately surveyed and mapped and the reproduction can show bedrock, rims, lava capping and the complex buried channel systems with fidelity to actual ground.

Following close on the educational value of the suggested form of exhibit would come the utilitarian value. Capital which has congested other industries in this State would be induced to flow freely and confidently into the chief profit-earning industry of them all—gold mining.

Concentrates.

SILVER buys as much of anything except gold as it did twenty years ago.

SUPT. HOGG, of the Princess mine, Butte Co., Cal., says he is taking out 150 ounces gold per month.

THE Noble Five Company at Nelson, B. C., will build a tramway and concentrator this summer.

THE Cripple Creek, Colorado, miners decline to strike in sympathy with the striking miners of Leadville.

IT is claimed that 45,000 tons of ore are treated monthly in the United States by the cyanide process, recovering $500,000.

THE Southern Pacific Co. has filed patents in the recorder's office at Bakersfield for 75,409.42 acres of land in the Visalia land district.

THE App and Rawhide mines, Tuolumne Co., are figuring on electro-plating works to do the silver plating required in their respective mills.

AT the State Fair at Sacramento next month there will be two rock drilling contests for miners. The directors have appropriated $400 for prizes in each contest.

L. E. WALKER, S. Wormser, F. Youngren, J. E. Shepard and C. Bonner have incorporated the Stockton and San Joaquin Electric Power Company, to operate at Fresno.

THE Luther Gold Mining Company yesterday incorporated in this city. Directors—E. R. Burke, E. B. Cushman, R. A. Harris, B. G. Smith, F. H. Rice. Capital, $100,000; all subscribed.

AT the Golden Scepter mine, Quigley, Montana, daily wages are: Superintendent, $10; mine foreman, $7; miners, $3.50; millwright, foreman, $6; millwright's, $4 to $4.50; laborers, $3.

AT Austin, Nev., the Austin Mining Co.'s tunnel is now 5000 feet in. There are 1000 feet more to be pierced; 100 men are at work, and it is expected the tunnel will be completed Jan. 1st, '97.

THE ordinary rule is reversed at the Benton mine, Bingham, Utah, where, as the work goes deeper, the ore changes from sulphurets to oxides. Utah is a land of marvels, furnishing silver in sand and gold in coal.

IN a recent drilling match at Wallace, Idaho, between miners from Canyon Creek and a team from Murray, the latter won the purse of $100, drilling 34⅛ inches in the regulation 15 minutes. The Canyon Creek team made 33 inches.

THE Shasta Dredging Company has incorporated to operate dredgers on mining properties. The capital stock consists of 50,000 shares at a par value of $1 each. The directors are P. and A. Becker, J. A. Chesmit, J. G. Barker and L. A. Gibbons.

THE Miners' Mutual Mining and Improvement Co. is a new Montana incorporation with a capital stock of $1,000,000 in $5 shares. Its plan is co-operative and applies some of the features of building and loan associations to mining investment and operation.

A CONTRACT to erect hoisting works at the Allison Ranch mine, near Grass Valley, has been let to W. C. D. Body. Horan Bros. and J. McLachlan have the contract to put in the pipe line. Machinery for electric, steam and water power will be put in.

THE Yuba County Supervisors have employed Dr. P. Durst of Wheatland at a salary of $300 a month to watch the hydraulic miners in the interest of Yuba alone. They at the same time withdraw their financial support from the Anti-Debris Association.

THE suit over the Apple and Brown Maria mines near Needles has been compromised, A. S. Barney, the holder of the contract to purchase the mines, agreeing to pay the owners $22,000 within twenty days, in default of which the title to the mine reverts to the owners.

THE mining districts of northeastern Washington, northern Idaho and the Rossland district of British Columbia are being swept by forest fires, destroying property and forcing a temporary suspension of work at many of the mines. The destruction of timber will be very large.

THE Chinese are not neglecting placer mining though they keep fairly clear of quartz mines. The Quong Foo Co. have bought the Lambing derrick at the Lambing mine in Amador Co. and are shipping it to Mills City, Nevada, where they will use it on a gravel claim they own there.

THE mining of beach sands for gold is reported as being carried on at Lompoc, Santa Barbara county, with, it would seem in the absence of details, fair returns. The statement is made that platinum is also recovered from the sands, which is questionable, certainly as to quantity claimed.

THE Nelson, B. C., smelter is to have additions to it, increasing its capacity at once. A water-jacket furnace of 250 tons capacity, roasters and a reverberatory furnace for the treatment of matte are to be built. An electric plant for the transmission of power and economizing of fuel are under consideration.

THE fall in the price of iron ore has forced the closing down of several of the large mines in Michigan. One company, ordinarily producing 1,000,000 tons a year, alone throws nearly 2000 men out of employment. The business condition is such that operators are unable to hold out any hope of reopening to the miners.

THE exceptionally hot weather is causing much suffering among miners and prospectors in the Mohave and Colorado districts. The temperatures are ranging from 124° to 128°, and many of the springs, few in number and scanty in supply at the best, have dried up, increasing the danger to life incident to travel.

IN consequence of the lateness of the season and depth of snow, the Gold Commissioners of British Columbia have been authorized to extend the time for completing assessment work 60 days from July 17th, where they have good cause to believe the claims inaccessible at the present time by reason of the snow covering them.

THE attorney for the Chinamen cited for contempt for hydraulic mining at Moore's Flat, Nevada county, after being enjoined, has proposed that the injunction be made perpetual, the extreme penalty of the law to be imposed if they work the mine again, and that any further proceedings in the contempt matter be temporarily suspended.

THE Alaska Treadwell Gold Mining Company reports its cleanup for June as follows: Period 31 days; bullion shipment, $68,913; ore milled, 21,451 tons; sulphurets treated, 405 tons; of bullion there came from sulphurets, $20,827. The working expenses for the month amounted to $28,087. The average yield was $3.21 per ton of ore milled.

EL DORADO COUNTY mines are receiving a share of the attention of the foreign capital appreciative of the gold mines of California. Col. W. J. Sutherland is reported to have secured for English capital several properties in El Dorado county, on which development has been done during the past year and will equip them with a milling plant immediately.

THE State Mining Bureau has in press, to be issued shortly, a paper on mining pumps and their installation by H. F. Behr, mechanical engineer. The high professional reputation of the writer, and the practical character his suggestions get by reason of their inspiration from California conditions and experience, will make the book a valuable addition to the library of the working miner.

NOW THAT President Neff, of the California Miner's Association is home he will, doubtless, immediately call a meeting of the executive committee to receive the report of its representative, Hon. Tirey L. Ford, which is awaited by many with considerable interest. It is understood that Mr. Ford's report is exhaustive, giving in detail the progress and present status of the whole matter.

LOUISVILLE, Ky., men who are credited with having sunk $300,000 in trying under mismanagement to make the Idaho mill and mine at Murray, Idaho, pay, have sold the property to Spokane and Coeur d'Alene men comprising the Katie Burnet and Josie Consolidated Mining Co. They will not build a mill on the Katie Burnet, as originally intended, but will operate the 20-stamp mill at the Idaho.

A LARGE electric transmission power plant is to be put up at the Calumet mine at Old Diggings, Shasta county, by Dr. Wm. Gardick, the owner of the mine, to supply the mines and mills at Old Diggings with power. The Hart mine is said to have contracted for 100 H. P. and other mines for lesser amounts. The water of Spring creek will be used and 300 H. P. developed. It is announced that A. B. Paul is to manage the enterprise.

READING of the stagnation in agricultural regions of the Mississippi valley and the East, the lack of market or price for the product of the surface soil, one is inclined to congratulate the farmers and fruit growers of California, resident adjacent to the mines, who are assured of a ready market and good prices from the miners, who have the money to pay for what they want, and who are thus the present mainstay of their agricultural brethren.

AT the monthly meeting of the Executive Committee of the Anti-Debris Association at Sacramento this week C. Mulkey of El Dorado county appeared and stated that he would keep his hydraulic mine closed down until he satisfied the Association that no more injury would result from its operation. W. T. Phipps reported on the condition of the mines watched by the Association, and R. T. Devlin reported on the cases against miners being conducted by him in the courts.

BUTTE COUNTY is the latest to the fore with the story of a ledge tramped over and discarded, principally, it appears, because it was big and white, for thirty or more years, which a little honest prospecting is demonstrating to be a gold mine. The ledge in question is on the Oroville and Quincy road, first used by the immigrants who entered California by the Beckworth Pass route. The discovery of gold value in the ledge is credited to a stranger from the outside—a tenderfoot.

RETURNING miners from Cook's Inlet, Alaska, say the country at the Inlet is barren of gold. They say the miners worked hard and prospected for 200 or 300 miles around the Inlet without finding a single claim that paid anything. Thousands of holes were sunk to bedrock, some of them having to be thawed out by fires before they could be dug. There was no work to be had and from 500 to 700 men are said to be stranded there without the means to leave the country.

SIMULTANEOUS with reports of a "1500-pound gold nugget" in the DeLamar, Nevada, mine, comes an apparently authentic statement that the proposed sale on a $3,000,000 basis of the mine to English capitalists is off, and that the transfer will not be made. There was a difference of about one million dollars between the present and would-be owners that blocked final settlement of the negotiations of purchase. Apart from the extravagant stories told concerning its richness, the mine is an unusually valuable property.

THE Gold and Silver Extraction Co., the owners of the MacArthur-Forrest cyanide process in America, are about to commence a suit to annul their contract with the local company who have the right to use the process in the four counties including the Black Hills district in South Dakota. They claim the local company has not complied with the terms of the contract, their plant being much too small for the amount of ore offering for treatment. The local company will not increase their plant nor permit the parent company to enter the field.

ALL the minor coins, cents and nickels, are made at the Philadelphia mint, and nearly 100,000,000 cents are coined every year. This large number is caused by the large annual loss in circulation. The profit of the Government on their manufacture is large. The blanks are made for $1 a thousand by contract. Blanks for nickels cost a cent and a half apiece. Austria has for some years been experimenting with nearly pure nickel for its minor subsidiary coins. A little cobalt is used to harden it. It is claimed to be satisfactorily tested by use.

THE owner of a mining claim, giving a working bond on it, can protect himself and his mine from liability for the cost of material furnished or labor done on the claim under the bond, by posting conspicuously a notice before work is commenced that the work is done under a bond or lease to such parties, stating their names, and that the owner disclaims for himself and the mine all liability for the cost of such work. The bond should have a condition in it that the party taking the bond will pay for all the work he does under the bond, and the bond should be recorded.

RANDSBURG, in the desert, fifty miles northeast of Mohave, has grown from nothing to a population of 1000 in less than four months, despite the limited facilities for mining. The water supply is still short, though the eastern part of the district has developed well supplies sufficient for its present needs. A pipe line, estimated to cost $40,000 to $50,000, on which the preliminary work is being done, will bring in sufficient water to admit of running large mills. An incident of the development of Randsburg is the revival of interest in the old Panamint mining district in the mountains west of Death Valley in Inyo county. Several sales of mines in this district to Colorado and Utah capital are reported.

AT Monday's meeting of the Debris Commissioners, permits were granted to reopen and hydraulic the Try Again mine near Placerville, and the Raffeto mine, both El Dorado properties. The latter is interesting as the permit was granted so that a rancher could get the tailings to give a top dressing to his land. The Spring Valley hydraulic mine at Cherokee, Butte Co., was granted a permit to work some bedrock cemented gravel, but not the main bank. A permit was refused the Buckeye mine near Volcanoville, El Dorado Co., because the debris could not be successfully impounded. The matter of a permit for the Omega mine in Nevada county will be considered at the next meeting of the commissioners.

ON the Comstock the Savage reports on the 850 level the upraise from the stopes in east crosscut No. 8 has been carried up to the 11th floor. The north prospecting drift from the 5th floor advanced 24 feet; face in porphyry and quartz. The south prospecting drift from the 5th floor of the north upraise advanced 20 feet; face in porphyry and quartz. Main south drift advanced 57 feet. This drift passed through a small streak of ore assaying $37 per ton; face in quartz. Usual work being done on the 750 and 900-foot levels. During the past week 90 tons of ore were milled at the Nevada mill; battery samples averaged per ton: gold $6.15 and silver 10 7-10 ounces; bullion on hand and at the mill of the assay value of $2515.88. No ore was hoisted during the week.

THE opportunities for power development from the waters of the Sierra streams, and the chances for commercial successes thereby, seem to be attracting attention and comment even if practical realization is slow in most of the propositions. The Stanislaus river, between Calaveras and Tuolumne counties, in the heart of the existing great development of the mother lode mines in both counties, is naturally the subject of much consideration as a source of transmittable power. Numerous surveys and examinations have been made and as many installations projected. The latest is to locate a head dam somewhere above Murphys, and by a ditch fourteen miles long to get 1280 feet of utilizable head for 5800 inches of water, all the low water flow of the river, and thus develop 17,000 electric H. P. for transmission.

IN Colorado, particularly, and to a lesser extent in other of the mining States, the practice of leasing blocks of mining ground on tribute to working miners whose capital is in their skill and strength provides opportunities for miners who would otherwise be unemployed. From the extent to which this is done the inference is fair that such arrangements make satisfactory returns to both mine owners and the men. While California mines present conditions that are not identical with Colorado mines, it would appear as if the practice of tribute leasing might be extended to the mutual profit of mine owners and men. There are undoubtedly properties which owners feel they must shut down that miners would be glad to lease in on terms that, by dividing the risks of loss, would justify operations being continued.

A SEQUENCE of the installation of the San Joaquin Electric Company's power house on the San Joaquin river has been the discovery that some of the near-by high bars of that river are desirable placer ground. The electric company, accidentally discovering this, located 320 acres and are preparing to ground sluice with the surplus water. The location of their canal is such that several other bars on both sides of the river can be worked and a pipe line is being put in for that purpose. The discovery, or rather development, for the existence of the gold in the bars was known, would indicate that the early-day miners did not work the more southern placer deposits of the Sierras as closely as they did the northern. There may be opportunities in shallow placers in this section for the working miner which he can work without waiting for the aid of capital.

THE State of Utah proposes to test its right to make selections of mineral lands under the grants made by the General Government, none of which it is claimed make an expressed reservation of mineral lands. The State Board of Land Commissioners have decided to select and enter a section of known mineral land, free from any adverse claimants, for patent to it under one of its grants, the board deciding that the State has as much a right to select mineral lands as any other kind in the absence of a reservation being made. Colorado owns and leases some mineral land, but that occurs through the discovery of mineral on school sections after patent to the State had issued. The selection of known mineral land under a State grant of school lands has been decided adversely to the State in California and the patents where issued have even been declared void where the land was known to be mineral at the date of selection.

IF a location of a mining claim is made for a stated length and width, and it is found, after the monuments have been fixed on the ground and described in the "Notice of Location," posted and recorded, that a less length or width than claimed has been included within the monuments, the monuments can be changed, or, if stakes, moved out, to get the claimed length and width. Provided the additional ground so included is subject to location—that is, is not claimed by any one else; and also provided that when this extension is made, a new "Notice of Location" describing the monuments as fixed by the change shall be posted and recorded. Such a "Notice of Location" should preferably have in it a clause reading substantially as follows: "This location is a relocation made for the purpose of amending and more exactly defining the boundaries of the ground claimed." A claimant should make all such amendments before an official survey for patent is applied for. The deputy surveyor is required by his instructions to survey the monuments as he finds them on the ground. If he finds more ground within the monuments than the maximum permitted by the United States and district laws (if the latter exist), he must cut the claim down to this maximum, keeping within the monuments. He can cut it down further at the request of claimants. But he can, under no circumstances, include in his survey any ground outside of the monuments as he finds them. There are cases where stakes can be moved out by a claimant to get the full dimensions of his claim without posting a new "Notice of Location," but the safer and better plan, in which there is no element of chance, is to post and record this new "Notice."

The Gold Belt of Gunnison County, Colorado.

Written for the MINING AND SCIENTIFIC PRESS by THOMAS TONGE.

Among the new gold producing districts coming to the front in Colorado is that of Gunnison County. The information here given was obtained personally by the writer in two trips in April and May, occupying altogether over two weeks, and involving 300 miles of wagon riding in order to visit a large number of the mines and more or less developed prospects of this gold belt, which is, roughly, about 65 miles long with an average width of about 15 miles. The writer was accompanied by Arthur Lakes, who has had over 20 years' practical geological experience in Colorado.

The southern end of the belt is easily accessible from the town of Gunnison (on the Denver & Rio Grande Railroad and the Denver, Leadville & Gunnison Railroad), daily stages running between Gunnison and Iris, Chance, Vulcan, Spencer, Dubois, Tolifero, etc.

Commencing with the eastern end of the southern portion of the belt, viz., in the valley of Cochetopa Creek, years ago gold bearing ore was known to exist there, but in such form and of such grade that its remoteness from railroad and treatment then precluded its being profitably mined and treated. The subsequent improvements in mining and ore treatment and the reduced cost thereof have now brought this district within the range of a dividend paying proposition.

The district around Iris and Chance has been fortunate in the fact that it has already attracted practical men with capital, and the result has been the opening up of the Mineral Hill group with most encouraging success. A description of this particular property presents a valuable lesson. In June, 1895, two prospectors found and followed an outcropping, sunk on it, found vein of gold bearing free milling quartz, pushed the work, exhausted their means, were unable to procure the necessary hoisting plant, stamp mill, etc., and became financially embarrassed. The property was submitted to O. P. Posey, one of the owners of the Tomboy mine near Telluride, who, after investigation, acquired it for his copartners in the Tomboy and himself, for nominal cash payment, formed a private company, erected hoisting plant, sunk new shaft 190 feet deep, about 1500 feet of drifts on a vein of gold bearing quartz of an average width of 5 feet, and erected a 20-stamp mill and pumping plant. The total cash invested up to the present date is upwards of $75,000, and the results are 60 men at work and about 70,000 tons of ore in sight, blocked out and ready for stoping, which averages about $13 per ton in free milling gold and can be mined and treated for about $3 per ton. In other words, $700,000 net in sight for an investment of $75,000.

The special importance of this property is that the owners, so far, are the only people with capital who have hitherto gone into that particular section. While their above-mentioned improvements have been in progress, the owners of other claims in the district, encouraged by the confidence displayed by the owners of the Mineral Hill group, did further work on their own claims, and the result is that today, within a radius of a few miles from the Mineral Hill group, there are a number of prospects which have now as good or better showings than the Mineral Hill group had when its present owners took hold of it.

The vicinity of Chance shows veins from 4 to 5 feet thick of white quartz, carrying gold.

At Vulcan, as shown in the Vulcan and Mammoth Chimney mines, there has been geyser action, producing bonanza gold deposits near the surface, running as high as $1600 per ton, and, with depth, gold-bearing pyrites.

Near Spencer is the Iron Cap mine, owned by Iowa men, with a free milling vein from 3½ to 8 feet wide, averaging $36 gold per ton. There is a 5-stamp mill on the property.

Near Spencer, too, is the Old Lot mine, which has been taken hold of by D. Hyman, of Aspen, Col. It is at present the deepest mine in the southern end of the belt, being over 200 feet deep.

At Dubois, Iowa capital is pushing the Dubois tunnel, now in over 300 feet, and expected soon to strike the first of a series of parallel rich veins, which are exposed on the top of the mountain and assay well.

In the Goose Creek district is the Carpenter Hill group of seven claims, in which A. T. Hathaway, of the San Juan district, is interested. There are 500 feet of shafts and levels, exposing free milling veins ranging from 5 to 20 feet wide, averaging from $8 to $20 gold per ton.

In addition to the more developed properties mentioned above, there are throughout the whole district, from Cochetopa creek to Lake Fork, numerous other less developed properties of great merit, some of them being actively pushed, with encouraging results, and others only needing the judicious expenditure of a moderate amount of capital to become ore-shipping, dividend-paying mines, while in the intervals between such properties the entire country is more or less dotted over with promising prospects, as yet in the hands of the original impecunious locators, who are unable, for lack of means, to proceed further than the "windlass stage" with development work. Such men, as a rule, are glad to sell their claims for very moderate sums or to give an equal or even a controlling interest to anyone furnishing capital for further development work.

The northern end of the gold belt, including the Quartz Creek district, Box Canyon district, Tin Cup, Union Park, Cross Mountain and Taylor Park, is most accessible from Pitkin on the Denver, Leadville & Gunnison Railroad.

In the vicinity of Pitkin, in the triangle of country, two sides of which are bounded by Ohio creek and Quartz creek, the only really developed mine is the Sacramento, in which the ore body is continuous and well mineralized, remarkably even in character. The property is developed by some 5000 feet of tunnels and levels, the ore ranging from $20 to $300 gold per ton, the production to date being nearly $300,000. What has been and is being done at the Sacramento can apparently be duplicated at fifty other properties in this triangle, the only question being one of capital.

It is within the mark to say that about a dozen mines within a few miles of Pitkin, with judicious management and a moderate amount of capital, could at once or in a very short time ship gold ore and pay dividends. There are scores of less developed properties which only need capital to put them in the shipping list.

Pitkin was a great silver-producing district prior to 1893, and the Cleopatra and Fairview mines on Fairview mountain, seven miles from Pitkin, compare favorably with the very best mines of Aspen and Leadville, as, owing to the extreme richness of the ore, they have never ceased shipping. When silver is remonetized, Pitkin will enter upon an era of great prosperity. In Chicago Park, near Pitkin, a few years ago, two holes were bored nearly 1000 feet deep, penetrating much the same strata as at Aspen, but revealing three rich silver ore zones instead of one. The fall in silver in 1893 prevented shafts being sunk at the bore holes. Within a short distance is a similar basin where bore holes revealed equally good prospects. Such investigations demonstrated the fact that in the vicinity of Pitkin are two of the largest silver ore basins as yet known in Colorado, both practically virgin ground.

Tin Cup is surrounded not only by silver mines, now closed down owing to the low price of silver, but by rich gold placer ground in Bertha gulch and other gulches, Union Park and Taylor Park. Some of these have been worked for many years, though only by hand—that is, without any appliances on a large scale, involving the investment of capital.

Ten miles north of Tin Cup, in Taylor Park, a company composed of Boston capitalists is developing a most important placer enterprise. The company owns about 3000 acres of ground and is building a ditch from Taylor river 17 miles long, 8 feet wide on the bottom, 10 feet wide on the top, 3 feet deep, with a fall of 15 feet per mile, carrying 2000 miners' inches of water, the total cost of such ditch being estimated at $38,000. The company is also building a second ditch from Texas creek 6½ miles long, 5 feet wide on the bottom, 7 feet wide on the top, 2½ feet deep, with a fall of 20 feet per mile, carrying 1500 miners' inches, the total cost of such ditch being estimated at $12,000. Next spring these two ditches will furnish water for hydraulic placer mining on an extensive scale. The lowest estimate of any of the experts as to the gold in the gravel is 25 cents per cubic yard. One single gulch, representing one-tenth of the company's ground, is expected by the experts to yield $2,000,000 in gold.

There are at least 200 square miles of gold bearing gravel in and around Taylor Park, Union Park and Tin Cup; the Boston capitalists are the first who have approached the matter with capital on a large scale; they have only got a mere fraction of the ground; what they are doing others have every opportunity to do in adjoining places.

At Cross mountain, seven miles from Tin Cup, the Wall group presents a valuable object lesson. J. W. Taylor commenced work August 1, 1895, and found considerable ore that panned and assayed well. He put up a small stamp battery and in fifteen days ran through it 151 tons of ore, the result being very satisfactory. The ore averages $65 or $70 per ton and he saves from 60 to 70 per cent of the assay value on the plates. During the past winter he has continuously employed 18 men and an assayer. With cyanide from 90 to 98 per cent of the assay value of the tailings can be saved. At the time of our visit there were 600 feet of workings all in ore and 1800 tons of ore on the dump. The vein varies from 18 inches to 7 feet in width and there were four different places where a shift of men could be set to work on ore apparently belonging to the same ore body.

M. HENRY has discovered the power of sulphate of zinc to absorb sunlight and give it back in the dark. Poudre de riz made with this mineral gives a soft luminosity to a fair young face. A lady cyclist dusted all over with this powder is in herself a lamp on a pitch dark night. The luminous pigment is not liable to be spoiled by damp, by carbolic acid or by any weak acid. It resists rain if united to some strongly adhesive body. There is a house in Paris where a windowless set of rooms is lighted with it. The lady of the house receives there her friends at "five o'clocks." The apartment seemed bathed in moonlight, the curtains are as if studded with glow-worms, the ceiling scintillates. The furniture looks as if rubbed with phosphorus. The play of this light on colored objects gives one the impression of Aladdin's underground palace. Often they take the rich, glowing tones of the topaz, ruby and emerald. This powder does not lose its brilliancy if used in starch or size. A black dress trimmed with lace made luminous by it is more than bewitching.—Scientific American.

Locating Mining Claims.

TO THE EDITOR:—I have before me your question, "Is it the law that one stake or monument is or may be a sufficient marking of a mining location, under the statute of May 10, 1872 (Sec. 2324 R. S. of U. S.) which says: 'The location must be distinctly marked on the ground so that its boundaries can be readily traced'?"

This question has been so often answered by decisions of the courts, that at this late day there can be but one answer possible, and that is in the negative.

A due regard to the distinction between the "discovery" monument or stake, which is usually erected when a lode is first discovered, and the final marking on the ground, whether by stakes, monuments or otherwise, intended as the "location" of the lode, which is usually made after more or less examination of the ground, will prevent the confusion existing on the subject.

In the case of Doe v. Waterloo Mining Co., 70 Fed. Rep. 455, decided by the U. S. Court of Appeals on Nov. 8, 1895, the law of the matter is fully and clearly stated as follows:

"From the evidence it appears that on the 26th day of March, 1881, one P. H. Newbill made the discovery of a mineral-bearing vein or lode in what was called "Grapevine Mining district," San Bernardino County, Cal. On that day he posted a notice upon said premises known as the "Red Jacket" lode or claim, claiming the right to locate 1500 feet on said lead and 300 feet on each side of the same, and also claiming the right to have 20 days from said date in which to complete his boundary monuments. * * * *

"The notice of Newbill should have no other force than a notice of discovery. As a notice of discovery and intention to claim and locate the ground described therein, it was certainly sufficient. Erhardt v. Boaro, 113 U. S. 527, 5 Sup. Ct. 560; Marchall v. Manufacturing Co. (S. D.) 47 N. W. 293.

There is a considerable space in the brief of appellee devoted to maintaining that the notice and acts of Newbill were a sufficient location of the Red Jacket claim; that the one stake he placed upon the ground, claiming 500 feet one way and 1000 feet in another way on the vein discovered, with 300 feet on each side of the same, was a sufficient marking of the boundaries thereof. In the location of quartz lodes, before the mineral act of 1872, such a mode of location was common. Since that date I know of no instance in which such a location has been sustained. Since that date it has generally been held that, in some way, the location should be made in the form of a parallelogram, and the location so marked that its boundaries can be readily traced. The cases of Golden Fleece, etc., Co. v. Cable Consol., etc., Co., 12 Nev. 312–330; Book v. Mining Co., 58 Fed. 106; Gleeson v. Mining Co., 13 Nev. 442–458; Holland v. Mining Co., 53 Cal. 149; Gelcich v. Moriarty, Id. 217, maintain fully that such a location as is claimed for Newbill is insufficient. It is also claimed that the above-named cases decided by the Supreme Court of California were overruled by the same court in the case of Carter v. Bacigalupi, 83 Cal. 187, 23 Pac. 361. I do not think this should be asserted. The question presented in the last case was the sufficiency of a location notice under the local rules of the district, and not as the marking of the boundaries of a claim. Certainly it does not purport to overrule the former cases. Many cases might be cited from other States and Territories showing that such a location is invalid. Yours very truly,

San Francisco, July 17, '96. JOHN M. WRIGHT.

ALUMINUM bars and rods are now being extensively manufactured by the hydraulic extrusion process. A large quantity of gun-metal tram rails have been made by the same process, and experiments are being made to utilize the process to turn out steel rails.

THE per capita of gold money in the United States is: Gold, $8.78; silver, $8.89; paper, $5.92; total, $23.59. France has, per capita: Gold, $22.19; silver, $12.74; paper, .85; total, $35.78. Germany has: Gold, $12.21; silver, $4.20; paper, $1.18.

WYOMING is to have a new national park. A treaty has been concluded with the Shoshone and Arapahoe tribes for the cession to the Government of a section of land ten miles square in one section of the reservation.

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from issue of July 11th.

SHASTA COUNTY—Continued.

NAME OF MINE	Character of Mine	No. of Men Employed	Location	Name of Superintendent or Agent	Address
Black Prince	Silver & gold.	1	2 m NW of Igo	Unknown	
Con. Kosciusko	Gold.	11	6 m NW of Redding	Dr. K. W. Medoinez, Supt.	Redding
Clipper & Snider	"	14	7½ m N of Kennett	J. Barron et al, Owner	Kennett
Copley & Diamond King	"	2	Copley	J. R. King, Own	Copley
Crowo Point	"	2	8 m NW of Delta	L. Johnson, Own	Delta
Central	"	2	7 m NW of Redding	W. F. Whitehouse & G. Bliss Own.	New York
Chrome Iron Works	"	1	1½ m W of Sims Station	Hull & Jones, Own	Sims
Cram Point	"	7	8 m SW of Redding	Parker Fayler et al, Own.	Oakland
Chicago	"	2	1 m W of Igo	Wm. Irelan Jr., Own	S F.
Dog Creek	Gravel	1	1 m NW of Delta	C. E. Brown, Supt	Redding
Delta Lara Gap	Gold.	2	¾ m SW of Delta	G. S. Denning, Own	Redding
Diamond	"	3	5 m W of Delta	M. B. Butler, Own	Bayles P. O.
Dry Creek Tunnel Co	"	2		H. G. Harvey, Supt	Ono P. O.
Empire	"	18	5 m W of French Gulch	J. H. Morton, Supt	French Gulch
Eureka Tellurium	"	5	2½ m NW of Redding	J. Scott Ludlum, Supt	Redding
Edna B	"	5	3 m S of Shasta	J. Brecker, Own	Anderson
El Dorado Eureka	"	2	3 m S of French Gulch	E. P. Connors, Own	Redding
Extension Lucky Baldwin	"		Harrison Gulch	A. J. Fowler & L. Rhodes, Own.	Middle Bar
Empire	"	3	13 m NW of Ono	Lockhardt & Wagner, Own.	Ono
Excelsior	"	2	15½ m NW of Ono	J. F. Lockhardt et al Own.	Ono
French Gulch	"		3¾ m NW of French Gulch	— Richardson, Supt.	Redding
Falls	"	2	1 m W of Igo	E. L. Ballou, Own	Igo
Gladstone	"	17	5 m NE of French Gulch	F. Brightman, Supt	French Gulch
Gold Bar	"	5	½ m NE of French Gulch	Ellis J. Porter & Co., Own.	French Gulch
Gage & Martin	"	2	1¼ m S of Shasta	Gage & Martin, Own	Redding
Gossan Group	Copp'r		3 m W of Delta	Sanders & Brown, O'n	Delta
Gold Hill	Gold.	4	35 m W of Cottonwood	Fowler, Rhodes & Benton, Own.	Middle Fork
Grey Fox	"	2	Harrison Gulch	W. R. Conant et al, O'n	Castella
Gold Leaf	"	2	3 m NW of Redding	W. B. Miller, Own	Middle Creek
Grab	Copp'r, silver & gold.	1	7 m SW of Copley	J. H. Stowell, Own	Copley
Gardener Bros	Gold.	4	½ m NE of Ono	Gardener Bros., Own.	Ono
Grey Eagle	"	2	7 m W of Ono	Loomis & Hall, Own.	Ono
Hot Springs	Sulph'r		20 m N of Montgomery Ck	Unknown	Copley
Holman	Gold.	1	2 m SW of Copley	J. Holman, Own	Copley
Hardscrabble	"	8	Near Igo	R. G. Harvey, Supt	Igo
Hall's Claim	"	3	10 m NW of Ono	M. Hall & J. Landis, Own.	Ono
Indiana	"	2	Matton Creek	P. H. Roan et al, Own	Copley
Iron Mountain	"	500	15 m NW of Redding		Redding
Jay Eye See	"	3	4 m E of French Gulch	J. J. Johnson, Supt	French Gulch
Juras Claim	"	2	Bully Choop Mountain	J. L. Lockhart, Own	Ono
Joe Davis	"	2	11 m NW of Ono	W. McCormick, Own.	Ono
Jerusalem Bar	"	3	9 m NW of Ono	J. Barnes & J. Moore, Own.	Ono
John Doeblein	"		3 m E of Igo	J. Doeblein, Own	Igo
Kosk Creek	Copper & gold.		Junc. Kosk Ck. & Pitt Riv.	Clay Taylor	Redding
Lilla	Gold.	2	9 m W of French Gulch	Thos. Gruss, Own	Deadwood
Live Oak	"	2	4 m W of Redding	W. T. Hiatt, Own	Buckeye
Little Maud	"	8	7 m NW of Shasta	P. Murray, Supt	Redding
Lime Stone	Quar'y	2	3 m S of Kennett	Holt & Gregg, Own	Red Bluff
Last Chance	Gold.		Harrison Gulch	M. Mar & Crawford, Own.	Middle Fork
Midwinter	"	2	2½ m E of Redding	T. Harrison, H. B. Jackson & J. Booth, Own.	Buckeye
McCarty, Saltzer & Smith	"	2	1½ m NW of Redding	McCarty et al, Own	Redding
Mammoth	"		3 m N of Copley	T. Kenyon, Own	Cow Creek
Molin	"	2	3 m N of Shasta	Mrs. Molin, Own	Shasta
Mountain Top	"	2	5 m W of Redding	W. Copeland, Own	Redding
Magnesia	Magnesite		18 m W of Cottonwood	— Durren, Own	Middle Fork
Niagara	Gold.	45	5 m W of French Gulch	R. E. Handy, Supt	French Gulch
New Year and Australian	"	2	1½ m N of Shasta	Cunninghan & Garrechty, Own.	Shasta City
Old Spanish	"	8	5 m W of Redding	J. C. Frick, Supt	Shasta
Occidental	"	9	Bully Choop Mountain	G. A. Grigsby, Supt	
Poor Man's Friend	"	5	12 m W of Hayfork	W. H. Friend, Own	Hayfork
Redding Electric Light Co	"	3	1½ m E of Redding	Redding Electric Light Co., Own.	Redding
Rickard Claim	"	2	15½ m NW of Ono	Murray Estate, Own	Ono
Summit Group	"	2	5 m W of French Gulch	Wheeler & Morrell, O'n	French Gulch
Sanders-Volmar	"	2	5½ m W of Delta	Messrs. Volmar, Own	Trinity Center
Siatonas	"	2	4 m N of Delta	Bond & Hunter, Own.	Delta
Salt Creek Group	"	4	4 m N of Redding	E. P. Connor, Own	Redding
Stratite	"		8 m W of Redding	E P. Connor, Own	Redding
Summit	"	2	7 m NW of Ono	Bell Bros., Own	Shasta City
Three Sisters	"	9	2 m NW of French Gu ch	E. Ellery & Bro., Own	French Gulch
Tom Green	"	9	4 m NW of French Gulch	Kelly, Madden & French, Own.	French Gulch
The Daisy	"	2	5 m NW of French Gulch	Smith, Early & Rainhaus, Own.	French Gulch
Trinity Consolidated	"	14	6 m N of Delta	N. Vestal, Supt	Bayles
Top Knot	"	2	5½ m N of Delta	Nelson Thomas, Own	Delta
Texas Cons	"	75	6½ m NW of Redding	R. G. Hart, Supt	Redding
Talc Mine	Talc.		2½ NW of Sims Station	N. R. Courant, Own	Castella
Tom White's	Gold.	12	½ m S of Igo	Chinese Co	Igo
Uncle Sam	"	80	7 m NW of Kennett	S. J. Johns, Supt	Kennett
Windy Camp	Silver, copper & gold.	4	7 m NW of Copley	W. M. Morrisy, Own	Shasta City
Washington	Gold.	24	3 m W of French Gulch	— Delano, Supt	French Gulch

SIERRA COUNTY.

American Exchange	Gold.	8	9 m NW of Sierra City	G. Morrison, Owner	Sierra City
Adelaide	"	2	9 m NE of Sierra City	H. H. Bates, Supt	Sierra City
Bruckerman	"	2	¾ m NW of Poker Flat	T. Bruckerman	Poker Flat
Bunker Hill	"	30	4 m E of Gibsonville	D. Conlan, Own	St. Louis
Butcher Ranch	"		10 m N of Sierra City	J. Van Slyte, Own	Donnerville
Bull of the Woods	"	4	11 m N of Sierra City	M B. Shreever et al, Own.	Mohawk
Bonanza	"	55	3 m NE of Sierra City	H. G. Smith, Supt	Sierra City
Butte Saddle	"	20	2 m NE of Sierra City	Sam Miller, Own	Sierra City
Bigelow Mine	"		¼ m NW of Sierra City	Mrs. Bigelow, Own	Sierra City
Bald Mountain Ext'n	"	40	2 m NE of Forest City	J. A. McDougall, Supt	Forest City
Brandy City M. Co	"	15	Brandy City	Allenberg & Goldstein, Own.; J. Redington, Supt.	S. F. Brandy City
Crown Point	"	6	11 m E of Gibsonville	Carmichael, Sinnot et al, Own.	Gibsonville
Campbell Hot Sp'ngs	Sulph'r	2	1½ m E of Sierraville	H. Pearce, Own	Sierraville
Cracroft M. Co	Gold.	10	4 m NE of Downieville	H. Spaulding, Supt	Downieville
Cleveland	"	8	5 m SW of Sierra City	J. Bean, Supt	Sierra City
Depot Hills	"	4	5 m N of Comptonville	F. Joubert et al, Own.	Comptonville
Eureka M. Co	"	12	8 m N of Downieville	Spaulding and Mowry Bros., Own.	Downieville
Excelsior M. Co	"	8	4 m N of Downieville	G. Costar & Sardine, Own.	Downieville
Eclipse	"	2	1 m S of Alleghany	Appel & Grant, Own.	Alleghany
El Dorado & Bullion	"	10	1½ m S of Alleghany	Fipler Estate; — Roscrans, Supt.	Alleghany

—*Begun in issue of April 25, '96. (To Be Continued.)

Scientific Progress.

How Electricity Manifests Itself and What it Can Do.

A. E. DOLBEAR.*

(Continued from Last Issue.)

Are there any phenomena which imply that rotation is going on in an electrical conductor? There are. An electric arc, which is a current in the air, and is, therefore, less constrained than it is in a conductor, rotates. Especially marked is this when in front of the pole of a magnet; but the rotation may be noticed in an ordinary arc by looking at it with a stroboscopic disk, rotated so as to make the light to the eye intermittent at the rate of four or five hundred per second. A ray of plane polarized light, parallel with a wire conveying a current, has its plane of vibration twisted to the right or left, as the current goes one way or the other through the wire, and to a degree that depends upon the distance it travels; not only that, but if the ray be sent, by reflection, back through the same field, it is twisted as much more—a phenomenon which convinces one that rotation is going on in the space through which the ray travels. If the ether through which the ray be sent were simply warped or in some static stress, the ray, after reflection, would be brought back to its original plane, which is not the case. This rotation in the ether is produced by what is going on in the wire. The ether waves called light are interpreted to imply that molecules originate them by their vibrations, and that there are as many ether waves per second as of molecular vibrations per second. In like manner, the implication is the same, that if there be rotations in the ether they must be produced by molecular rotation, and there must be as many rotations per second in the ether as there are molecular rotations that produce them. The space about a wire carrying a current is often pictured as filled with whorls indicating this motion, and one must picture to himself, not the wire as a whole rotating, but each individual molecule independently. But one is aware that the molecules of a conductor are practically in contact with each other, and that if one for any reason rotates, the next one to it would, from frictional action, cause the one it touched to rotate in the opposite direction, whereas, the evidence goes to show that all rotation is in the same direction.

How can this be explained mechanically? Recall the kind of action that constitutes heat, that it is not translatory action in any degree, but vibratory, in the sense of a change of form of an elastic body, and this, too, of the atoms that make up the molecules of whatever sort. Each atom is so far independent of every other atom in the molecule that it can vibrate in this way, else it could not be heated. The greater the amplitude of vibration, the more free space to move in, and continuous contact of atoms is incompatible with the mechanics of heat. There must, therefore, be impact and freedom alternating with each other in all degrees in a heated body. If, in any way, the atoms themselves *were* made to rotate, their heat impacts not only would restrain the rotations, but the energy also of the rotation motion would increase the virbrations; that is what happens always when an electric current is in a conductor. It appears that the colder a body is the less electric resistance it has, and the indications are that at absolute zero there is no resistance; that is, impacts do not retard rotation, but it is also apparent that any current sent through a conductor at that temperature would at once heat it. This is the same as saying that an electric current could not be sent through a conductor at absolute zero.

So far, mechanical conceptions are in accordance with electrical phenomena, but there are several others yet to be noted. I have spoken of electrical phenomena as molecular phenomena, and there is one more in that category and suggestive, that I wonder its significance has not been seen by those who have sought to interpret electrical phenomena. I refer to the fact that electricity cannot be transmitted through a vacuum. An electric arc begins to spread out as the density of the air decreases, and presently it is extinguished. An induction spark that will jump 2 or 3 feet in air cannot be made to bridge a perfect non-conductor of electricity. Is there more than one possible interpretation to this, namely, that electricity is fundamentally a molecular and atomic phenomenon, and in the absence of molecules cannot exist? One may say: "Electrical *action* is not hindered by a vacuum," which is true, but has quite another interpretation than the implication that electricity is an ether phenomenon. The heat of the sun in some way gets to the earth, but what takes place in the ether is not heat conduction. There is no heat in space, and no one is at liberty to say, or to think, that there can be heat in the absence of matter.

When heat has been transformed into ether waves it is no longer heat, call it by what name one will. Formerly such waves were called heat waves; no one, properly informed, does that now. In like manner, if electrical motions or conditions in matter be transformed, no matter how, it is no longer proper to speak of such transformed motions or conditions as electricity. Thus, if electrical energy be transformed into heat, no one thinks of speaking of the latter as electrical. If the electrical energy be transformed into mechanical of any sort, no one thinks of calling the latter electrical because of its antecedent. If electrical motions be transformed into ether actions of any kind, why, should we continue to speak of the transformed motions or energy as being electrical? Electricity may be the antecedent, in the same sense as mechanical motion of a bullet may be the antecedent of the heat developed when the latter strikes the target; and if it be granted that a vacuum is a perfect non-conductor of electricity, then it is manifestly improper to speak of any phenomenon in the ether as an electrical phenomenon. It is from the failure to make this distinction that most of the trouble has come in thinking on this subject. Some have given all their attention to what goes on in the matter, and have called that electricity; others have given their attention to what goes on in the ether, and have called that electricity, and some have considered both as being the same thing, and have been confounded.

*Journal Franklin Institute.

PROFESSOR LANGLEY'S remarkable instrument known as the bolometer, occupying the entire building of the astro-physical observatory attached to the Smithsonian Institution, is pronounced by Rene Bache the most delicate mechanical contrivance ever devised, inasmuch as its "senses" are more acute than those of any human being. Outside of the building a huge machine, the inside works of which are a clock-work mechanism, pumps sunshine through a long tube into a dark room, where the bright ray passes through a prism; the latter is not of glass, because glass is opaque to the invisible rays of the solar spectrum, but is of rock salt, carefully cut to a certain angle by the famous optician Brashear, and, though the prism looks almost opaque to the eye, it is as crystal to the invisible rays above the violet and below the red. Thus the operator is able to follow the invisible rays along their dark path, their presence and potency being accurately registered, by an instrument having for its most essential part a balance composed of a thread of spun glass and a tiny mirror, the latter attached to a piece of a dragon fly's wing.

SOME singular amalgams of chromium and mercury have recently been obtained by J. Feree by electrolyzing a solution of crystalized chromium chloride diluted with hydrochloric acid with a current of 22 amperes. In this way in a very short time 1½ kilo. of chromium

amalgam was obtained. The amalgam was washed with water and the mercury removed by squeezing in chamois leather. By distillation in vacuo a novel form of chromium was obtained, which takes fire spontaneously in the air, absorbs oxygen and nitrogen at the same time, disengaging enough heat to raise the whole mass to incandescence. It gives a number of very interesting reactions.

Electrical Progress.

Artificial Sunshine.

At the recent meeting of the American Institute of Electrical Engineers in New York, D. MacF. Moore presented a paper embodying the results of his researches in the direction of producing light with sensible heat. All efforts in the production of cold light have heretofore failed, because of the fact that with the exceedingly high potentials required for the production of the rapidly oscillating currents necessary to cause vacuum tubes to glow, ordinary insulating materials do not insulate properly. The nucleus of Mr. Moore's researches and inventions is that of a disruptive discharge of an induction coil, the break of which is produced in a vaccum. Under these conditions it is found that the phenomena produced by ordinary apparatus for producing glow light in a vacuum tube are wonderfully changed, both in power and quality of the light emitted. At the potentials which are used in this apparatus, ordinary insulating materials are adequate for all insulation of the system. The amount and kind of light emitted depends upon the suddenness of the break in the primary circuit of the induction coil, and this, under ordinary conditions, cannot be done rapidly enough to produce the desired effect, owing to the prolongation of the time of making and breaking the circuit caused by the spark which is produced at the make and break of an inductive circuit. By producing this break in a vacuum the narrowest conceivable complete gap in the metallic circuit results in an almost instantaneous discontinuance of current, insuring the proper conditions for the production of cold light. The apparatus by which these results are accomplished are extremely simple, consisting of an ordinary small electromagnet, a vibrating contact contained in a vacuum tube of any desired dimensions which furnish the light by the glow produced in its interior. The vibrating contact is formed of a steel spring rigidly supported at one end and connected in the circuit so that the attractions and repulsions of the electro-magnet located outside the tube inclosing it intermittently make and break the current in which the glow lamp is placed. This glow lamp consists of a simple glass tube of any desired dimensions, exhausted of air and provided with a tinfoil cap at each extremity. These caps are connected to the electric circuit. When the circuit so formed is supplied with current by a battery of a few primary cells, a beautiful glow resembling sunshine is obtained. The color of this glow when contrasted with the light of an incandescent lamp causes the latter to look reddish and to have a wasteful air, indicating the presence of heat waves, while the light of the former appears by contrast to be pure white. While the system has not yet been developed to a commercial basis, the hall of the institute was beautifully lighted by these tubes during the presentation of the paper. A decided advance has been made upon what was thought impossible even a year ago, and the many advantages possessed by cold light mark it as the light of the future for general illumination purposes.

Electrical Hardening of Steel.

A new invention in electrical metallurgy is a process by which it is reported that the inventor, Mr. Taux, has executed the following experiments before a committee of engineers at Strasburg. A drill hardened by electricity pierced a shell twice as quick as a drill of the best steel hardened in the ordinary way. The drill was closely examined afterwards by means of a strong microscope, and not the least injury could be discovered. An electrically hardened circular saw cut iron bars with surprising ease. With a cold chisel similarly treated a steel bar, ½x1 inch, was cut through and the operation was repeated five times on the same bar. Then a cast steel plate, ¼ inch thick, was cut with the chisel, the edge of which showed neither a fissure nor any other alteration afterwards. An electrically hardened table knife cut iron wire of ⅛ inch diameter just as easy as a cotton string. The process is said to consist in the hardening of the red hot steel objects in a conductive bath traversed by an electric current.

ELECTRICITY is one of several forms under which energy becomes appreciable, and, like heat, light or work or any other form of energy, it is measurable and can be produced by or converted into other forms of energy. Farming is carried on in some portions of the world by electric currents passed beneath the ground. In places where the earth has been electrified, production has been increased and the quality of products made superior. After experiments of this character potatoes have been found to show 11 per cent in weight of yield and wheat from 28 to 56 per cent. Roots and esculent vegetables have been harvested four times superior to such product from ground not electrified. In France they have a system of treating wines, called the De Meriten system, after the discoverer, by which currents of electricity are passed through the wines to mellow and preserve those in a healthy condition and to arrest deterioration in those beginning to give way.

THERE are eight storage battery roads in Europe, four of which were installed during the past year. The largest system of this type comprises three roads in Paris, operating nineteen storage battery cars, some of which have been doing duty since 1892, and the addition of a third road last May seems to indicate that for the conditions there existing the storage battery has proved satisfactory. The other four roads are located—one at Birmingham, England, one at Hague-Scheveningen, Holland, and two in Austria-Hungary.—Electrical Review.

A NEW storage or secondary battery for locomotive purposes has been patented, in which the liquid forming the electrolyte, while having free access to the plates, is contained in a suitable absorbent to prevent the free movement of such electrolyte. This corresponds in secondary batteries to what is known as the day battery in primary cells.

Mechanical Progress.

Changes by Punching.

The changes that take place in a sheet of metal while it is having a round hole punched through it were experimentally investigated recently by M. Fremont, who gives the results of his experiments in a communication to the French Academy of Science. Brass, copper, soft steel and wrought iron, in plates 25 millimeters (1 inch) thick, and steel punches 35 millimeters in diameter were used. The die first used was 36 millimeters in diameter; afterwards one 39 millimeters in diameter was substituted, without altering the size of the punch. The hole made with the 36-millimeter die underneath was cylindrical, but with the 39-millimeter die it was conical. The greatest resistance offered to the pressure was the same in both cases, but the total resistance was much greater with the smaller die. From diagrams of the work done, it is shown that when the punch is one-third through the plate, the piece to be removed has been completely sheared round its edges, and the rest of the stroke is only required to push out the plug. Sections of metal plate, with punchings in various stages of completeness, were made by M. Fremont, a cut through the centers of the line of punch-marks being taken with a shaping machine, so as to expose the exact formation. The plug is at first cylindrical and the action of the punch is a shearing one. Later on the plug takes the form of two truncated cones, with their larger ends at the plate surfaces and their smaller ends together at the middle of the plate. When the die is not sufficiently larger than the punch, the hole made in the plate is ill-formed because of the crowding of the metal on the under side, where it then breaks off instead of flowing out. The diameter of the hole in the die should exceed the diameter of the punch by about one-fifth of the thickness of the metal to be punched.—Iron Industry Gazette.

Steel Shafts.

The fact that steel shafts break from the outside, instead of the inside, goes against the microscopical examination of minute bits of the interior of shafts, says *Engineering Mechanics*. One steamship engineer, who had put in 110 steel shafts in fourteen years, one of which had run 1,000,000 miles and is still good, did not take any interest in the microscope. Some engineers still favor the boring out of shafts in order to take away that part containing defects in casting; but this is not a general rule, because often the best part of the steel is towards the center of the shaft and not on the outside. In cooling off a steel casting the sulphur and carbon collected in the center, because that part remained fluid longest. Forgings need annealing just as castings do, but if a steel casting were put in an annealing furnace it would be ruined. One eminent engineer declares the proper way to make a steel shaft is with the hydraulic press. The custom of one well known maker of shafts is to anneal a straight forging, turn it in the lathe and then anneal it again. They produce the collars at the end by upsetting the metal, so as to get the fibers running round into the flange from the shaft. Just what fatigue of metal means in a chemical or mechanical sense is hard to define, as every worker in metal knows. Still, that is the only word we have to describe a result and condition.

IF shears are used for cutting off iron and steel, they should be very sharp and run close, with no lost motion whatever between the jaws. It is better for all nice work to have the stock cut off either by sawing or milling. An old shaper (a new one is just as good) may be rigged up as a special cutting-off tool. A piece of bar metal can be cut in two very quickly with such a machine. Being kept specially for that purpose, there is no time lost in hunting up cutting-off tools or in setting or adjusting the same. The machine is all ready to receive the bar of metal, and a few turns of the hand wheel cut it off, leaving a clean, square end.—The Tradesman.

ACCORDING to *Nature*, M. Moissan, the French chemist, is reported to have discovered a substance harder than the diamond, in the form of a compound of carbon and boron, produced by heating boracic acid and carbon in an electric furnace at a temperature of 5000 C. This compound is black, and not unlike graphite in appearance, and it is likely to supersede diamonds for boring rocks, cutting glass and other industrial purposes. It will even cut diamonds without difficulty, and can be produced of any required size.

REAMERS and taps can be tempered by heating first to a cherry red, next cooling off entirely in a gallon of water in which are dissolved two pounds of salt and one pound of lime. When perfectly cold polish with a fine emery brush; then heat iron ¾x4 inches to a black heat; at the point the change from black to red is observable. Lay reamer, tap or die on the hot iron, observe its color closely, and when it changes to purple put in water.

Practical Information.

Iron Ore in Mexico.

At the city of Durango, Mexico, is a mountain of solid iron ore. It is one mile long, 388 yards wide, and 640 feet high, and represents 1,246,984,244 cubic feet of ore.

Besides the ore exposed on the surface, there are undoubtedly beds extending for thousands of feet below, so that the supply of iron in this mountain may fairly be said to be inexhaustible.

The ore is in the form of the sesquioxide of iron called martite, a mineral having the form of magnetite, but the composition of hematite. From it may be obtained from 60 to 75 per cent of the pure metal. The mountain is surrounded by beds of jaspar and quartz-bearing rocks not unlike those out of which the Iron mountain of Missouri rises. Whether the mass is eruptive or has been deposited by chalybeate waters is a question which geologists have yet to settle.

The mountain is called Cerro del Mercado, or Hill of Mercado, after the Spaniard who came to it in 1562, led by the report that it was a mountain of silver. Till within a few years the ore has been worked only by local artisans, who sold the metal which they made for 35 cents a pound.

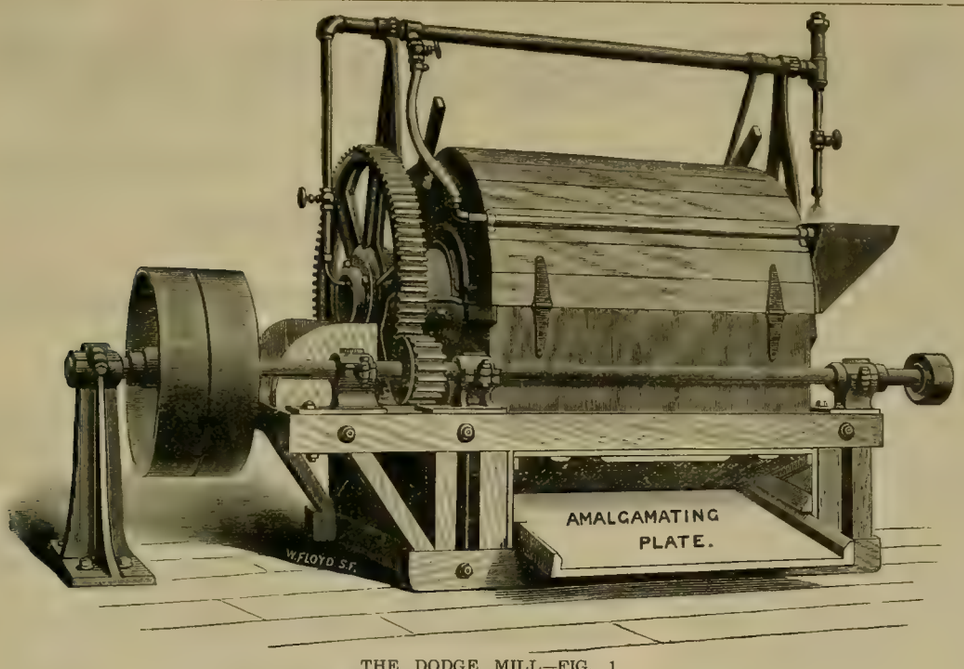
A COMPARISON of the losses of heat by the respiration of an absolutely dry and absolutely saturated air, shows that at 32° we lose 1172 caloric units; and at 86° and dry, we lose 1096 caloric units—a difference of only 76; but at 32° and saturated, we lose 1060 caloric units; and at 86° and saturated, 420 caloric units. The different states of dryness of the air appear thus to be of greater moment than the difference of temperature, and this is why our sensations do not always coincide with the thermometer. The working power of the body depends upon a certain amount of consumption, by which a certain amount of heat is necessarily created, and which has to leave the body in a regular way.

IN casting aluminum bronze care must be taken not to heat the metal too high or the aluminum will oxidize. The alumina thus formed mixes with the metal and makes the casting "dirty." The metal is also liable to be spongy from the presence of occldued gases. If the scum which floats on top of the bronze in a melted crucible goes into the metal trouble arises. This should be prevented by the use of suitable skim gates. The shrinkage of the metal is one of the greatest troubles in making aluminum bronze castings. This is overcome by giving the casting a large sinking head and "risers," but it is often necessary to make the sinking head as large as the casting.

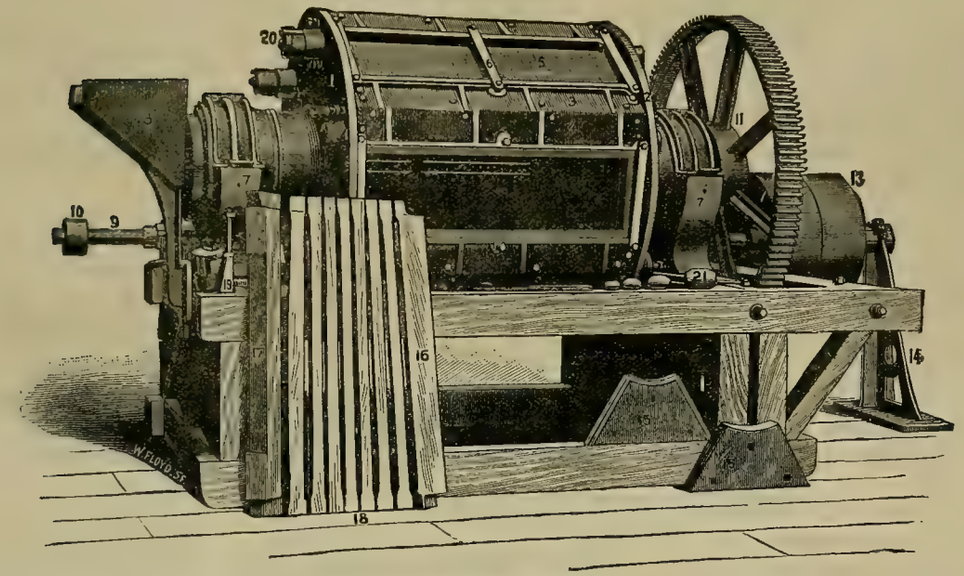
IN the operation of oil wells the flow of petroleum is apt to be retarded by the accumulation of paraffine in the pipes. To obviate the choking of the wells an electric heater has been devised, which consists of a resistance coil of wire to fit easily in the pipes. This is lowered into the well, and when paraffine deposits are encountered they are melted by the heat in the coils, and the clearing of the well is thereby secured.

INSURANCE companies have decided that electric lighting, when the wiring is well done—and they have formulated special rules on the subject—is the safest of all illuminants. Statistics show the following comparative risks: Fires in one year from paraffine and kerosene, 259; from gas, 110; matches used for gas, 35; candles, 88; arc electric lights, 7; and incandescent electric lights, only 1.

How much water shall we drink? Prof. Thos. G. Allen says, from one-third to two-fifths as many ounces as there are pounds in our weight. Thus a person weighing 168 pounds would drink 56 to 84 ounces, or 3½ to 4 pints daily.



THE DODGE MILL—FIG. 1.

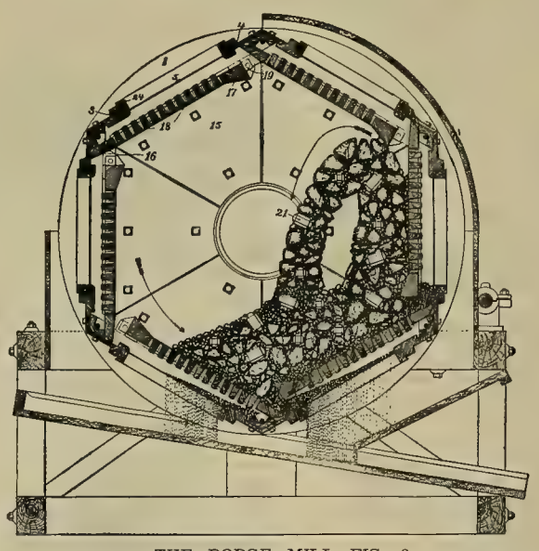


THE DODGE MILL—FIG. 2.

The Dodge Improved Mill.

Herewith is illustrated the Dodge Improved Mill, as manufactured by the Dodge Mining Machinery Co., M. B. Dodge manager, 65 First street, San Francisco, Cal. Fig. 1 shows the mill arranged for wet crushing. Fig. 2, a sectional view, shows that the mill consists of a hexagonal drum or barrel, into which the ore, after passing through a rock breaker, is fed through a hopper. The barrel is lined with steel bars held in place by wedges, and securely fastened. There is a space of ½ inch between each bar, forming a grating through which the ore passes to the screens, which are on each side of the hexagon, affording means of discharge for any ore that is crushed fine enough to pass through them, the coarser particles being returned to the interior of the barrel for further crushing. The ore does not slide in mass, being raised to a certain point and dropped by each side of the hexagon as the mill rotates, thus insuring effective crushing and little wear on the bars. Pieces of hard quartz or ore are used for crushing. Steel grinders, weighing about 15 to 30 pounds each, may be used for this purpose; or, preferably, both steel and quartz are employed. The mill is arranged for either dry or wet crushing, and, the makers say, gives equal satisfaction under either arrangement. When arranged as a dry crushing mill the water pipes and apron shown in the cut are not furnished, and the bottom frame is boarded up, forming a bin into which the crushed ore is discharged, and from which it can be removed by means of an elevator or other device. The jar, caused by the falling of the ore and steel grinders on the bars as the mill rotates, tends to clear the screens and prevents choking, thus adding to its capacity.

Three sizes are made, as follows:



THE DODGE MILL—FIG. 3.

Fig. 3 represents the mill in section. Each set of bars, Nos. 16, 17 and 18, forms a side of the hexagon, each overlapping the preceding side, and leaving a space between for the return of such ore to the machine as may be crushed fine enough to pass between the bars, but not fine enough to go through the screens. Looking at the top of the cut the direction of rotation is to the right, and when ore confined between the bars and screens reaches the highest point and begins to go down on the right hand side, as one looks at the cut, it will fall back into the machine between bar No. 17 and bar No. 16 of the succeeding set. When wet crushing is desired a constant stream of water plays on the outside of the screens, washing the pulp that comes through down to the apron below.

No.	Size.		Capacity.	Horse Power Required.	Tight and Loose Pulleys.		Revolutions Per Min.		Screen Surface.	Weight.	
	Diam.	Length.	Per 24 Hours.		Diam.	Face.	Pulleys.	Mill.		Heaviest Piece.	Total.
0	6 ft. 8 in.	4 ft. 6 in.	40 to 60 tons.	15	36 in.	12 in.	148	18	39½ sq. ft.	2000 lbs.	25000 lbs.
1	4 ft. 10 in.	4 ft. 6 in.	20 to 40 tons.	10	30 in.	10 in.	160	25	31 sq. ft.	1600 lbs.	18000 lbs.
2	3 ft. 10 in.	3 ft. 5 in.	10 to 20 tons.	5	26 in.	8 in.	170	32	17½ sq. ft.	600 lbs.	9000 lbs.

Rock Drilling Contests at the State Fair in September.

The Executive Committee of the State Fair have appropriated $800 to provide for two rock drilling contests, with $400 for each contest, to be divided into three moneys, at the State Fair at Sacramento, Cal., next September. A hand rock drilling contest between men is the drilling of a hole in rock with hammers and drills, the same as those ordinarily used in the prosecution of daily labor by miners in a mine, the contest being under certain rules and regulations. Experience in contests of this nature have led to the establishment of certain rules and regulations, the most of which are subject to slight change, but in the main those below given have been generally adopted throughout the world.

There are single hand, double hand and triple hand contests. The most popular of these is the double hand (two men) contest, though the single hand (one man) contest is also in favor.

The rules and regulations here given are with reference to a double hand contest, and need to be but slightly changed for either of the others.

Team—A team in a double hand contest consists of two men.

Steel—The men are to furnish hammers and drills.

Hammers—Hammers must weigh, without handles, not to exceed eight pounds.

Drills—All drills are to be of seven-eighths of an inch steel, and to be seven-eighths of an inch four inches from the bit.

Stroke—One man to strike at a time.

Turn—One man to turn the drill at a time.

Change—Men to change from striking to turning and from turning to striking as often as they desire. Generally changes are made each minute or half-minute.

Time—The time of drilling is 15 minutes at each hole.

Judges—Three judges are to have charge of the contest; they are to be appointed by the association.

Timekeepers—Two timekeepers are to be appointed by the association, whose duty it is to see that each team drills 15 minutes, no more and no less.

The winning team—The winner in a contest is the team drilling the deepest hole in the 15 minutes drilling.

Rock—The rock to be a block of Folsom or Rocklin granite (the harder and more uniform in formation the better) and is to be placed on the ground by the association, one piece to be tipped up so the holes in it will be drilled at an angle of about 45 degrees, one piece to be flat, so the hole can be drilled downward. The surfaces of the rock which are to be drilled must be faced. The judges must mark off the face of the rock in squares of not less than 5 inches each, each square to be marked by number.

Order of drilling and place for each hole—Each team must draw lots for members and drill in 1, 2, 3 order in the squares thus selected by lot.

Duties of the judges—The judges must take entire charge of the contest; see that all rules are properly and promptly obeyed; see that all steel is of proper size; see that all hammers are proper weight, which should not exceed 9¼ pounds, with handles; measure each hole as soon as the team's time is up; keep a record thereof, and, when all teams have finished drilling, announce the result and award the first prize to the team drilling the deepest hole, the second prize to the team drilling the hole next in depth, the third prize to that next in depth, and so on.

Entries—All entries to contests to close a few days before the time set for contests to begin.

Entrance fee—A small entrance fee to be paid by each team to the association as an evidence of good faith.

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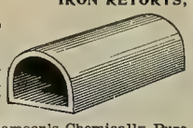

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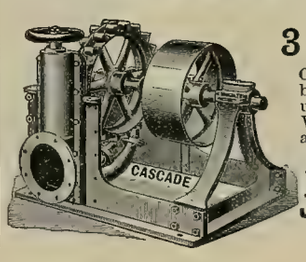

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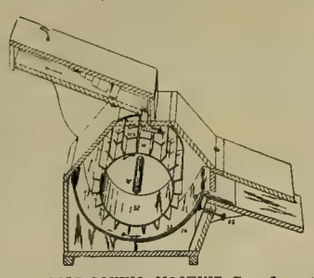

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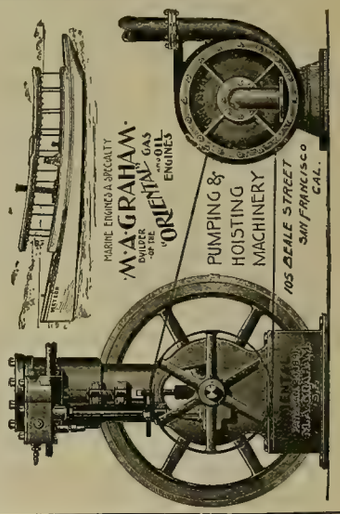
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Mining Summary.

CALIFORNIA.

Amador.

Record: At the Kennedy mine there are two triple compartment shafts equipped with every appliance for doing economical and effective work. A 40-stamp mill, with concentrating plant, treats the ore. An average of 125 men are employed in the mine and mill. From the 1200 level, which was reached in 1890, the mine has been a dividend payer. The total bullion output for the last nine years has been $6,000,000. The ore at the present time is taken from the 1700, 1850 and 1950-foot levels. The station is cut and crosscutting just begun at the 2100-foot level. A main east crossdrift is now being run from the 1950 level to penetrate the hanging wall, a conglomerate of slate and greenstone, beyond which an undeveloped ore body is believed to exist.

The shaft at the Oneida is down over 300 feet.

Butte.

(Special Correspondence).—The Golden Feather, Ltd., expect to get into their best ground in the bed of the Feather river early this season. The Banner gold mine, 4½ miles northwest of Oroville, is 3000 feet of quartz lode, bearing NE. and SW. The ore vein is from 8 inches to 2 feet thick; free milling but carrying from 1½ to 2% of sulphurets. The 10-stamp mill, hoist and drills are run by compressed air, the power for which is transmitted by electricity from a water power two miles distant. The mine is worked through a vertical shaft down 1031 feet, the ledge being reached by crosscuts. About 30 tons per day are mined and milled, the ore coming from the development work at present. The crosscut on the 1000-foot level has reached the ledge opening up 400 feet depth of unbroken ground. The property employs seventy men. The Standard Gold and Silver Mining Co., W. S. Williams, Supt., is working several quartz claims at Oregon City, eight miles north of Oroville. Of these, on what is known as the Cambria, a double compartment shaft with steam hoist is down 487 feet on a NE. and SW. contact vein between serpentine and greenstone. The ore chute is 150 feet long and 18 inches wide. Ore is being taken out and milled from the 235 and 400-foot levels. It runs from $12 to $15 a ton. The mine employs eighteen men. The Spring Valley quartz mine, 2¼ miles north of Hengy (formerly called Oregon City), is being developed by a tunnel now in 800 feet, at which point it taps the ore body 200 feet from the surface. They have cross-cut and drifted on the ore body, which is low-grade, running about $6 per ton. The Spring Valley at Cherokee is being worked by a company of fifty Portuguese on shares. They make from $1 to $2.50 per day. The Morris Ravine G. M. Co., Geo. H. Evans, Gen. Manager, have abandoned their mine in Morris ravine, removing their plant to a tract adjoining the Magalia mine on the north and east where they are sinking a shaft to bedrock, prospecting for the Magalia channel. The Princess Gold Mining Co., Geo. E. Hogg, Supt., adjoins the Magalia. It is being developed by a 45° incline shaft now down 320 feet and into pay gravel, on which is a water hoist and steam pumping plant, recently completed at a cost of over $16,000. This company began operations in May, 1895. In running a drift through gravel some 60 feet without breasting out, they took out $5000. The Ram Creek hydraulic mine, W. W. Butterfield Supt., is 26 miles northeast of Oroville, near Brush creek. The mine has a water supply all the year for one giant, and employs four men.

L. P. McC.

Calaveras.

Citizen: Six men are employed on the Holland mine near town, recently bonded by Prince Poniatowski.

A depth of 325 feet has been attained in the Ford shaft with the ledge looking very promising. A station has been put in at 300 feet.

Two forces of men are at work on the Gottschalk mine. In the new shaft a depth of 60 feet has been reached. Sinking has been commenced in the old shaft.

A large water wheel has been placed at the Horswill gravel mine, and the pipe to convey water to the wheel is being laid. As soon as completed, operations on the tunnel will be resumed. It is estimated that 100 feet farther must be run to tap the channel.

The Gwin mine extends about a mile on the mother lode. It is owned by the heirs of the late Senator W. M. Gwin, but has been bonded for $400,000 for a long term to the Gwin Mine Development Company, the principal shareholders in which are D. McClure, Mr. Belshaw, Senator Voorhies of Amador county and F. Thomas the superintendent. The Gwins put down two shafts, one 200 and the other 1400 feet, partly crosscut the vein and did some stoping, taking from the mine $2,000,000. Ten years ago, obstacles were encountered, the mine was shut down, and since then the shafts have become filled up. A little over two years ago the present holders began work and have sunk a shaft farther to the north to a depth of 1300 feet, but starting down from a canyon it is now about 100 feet lower than the level where work was formerly abandoned. At that depth a 16-foot vein of ore running from $9 to $10 has been encountered. Thus far the Gwin Development Company has expented $90,000 in exploration, and has ordered a 45-stamp mill, which will cost $60,000 more. It is to be put at work on the body of ore already struck, but in the meantime the original intention of sinking the new shaft 1500 feet down is to be carried out.

The Butts mine has shut down temporarily. Preparations are being made to sink a new shaft.

At the Peirano mine at Albany Flat a steam plant is being put in.

Osborn and Murray struck a vein on the Field's ranch about a foot in width, which has widened to 14 feet 20 feet down. The ore averages from $5 to $10 per ton.

Del Norte.

Record: Copper-mining interests in Del Norte are beginning to revive, judging from reports. Portland parties who recently bonded several claims at Low Divide, and representatives of New York capital interested in claims in the same vicinity, are expected at the mines shortly. This, with the formation of a local company to develop a copper ledge in the Big Flat mining district, looks promising. The local company will incorporate for $62,000, in shares of $2 each.

El Dorado.

(Special Correspondence).—On the Rosebud, twenty-seven miles east of here, the new tunnel is 88 feet on a 3-foot ledge of very fair ore. This property is owned by Melton & Roberts. It was abandoned years ago, but the present owners are encouraged in prosecuting the work by the discoveries thus far made.

A permit to hydraulic has been granted the Varozza Brothers, three miles east of town.

In the copper mine recently secured by Head, Clark & Bind a shaft was sunk to water depth. A tunnel is now being run on the lode. There are 800 tons of ore on the dump. The ore is composed of malachite, sulphate of copper and oxide of copper, carrying gold and silver.

G. Reiber, twelve miles east, has an aggregate of 330 feet of tunnels and drifts completed. He is opening a large gravel property on an extensive scale.

A contract has been let for a new tunnel on the Blue Gouge, which is already well advanced. If this tunnel discloses an ore body equally as good as the tunnel recently completed higher in the hill, it is a foregone conclusion that extensive milling facilities will soon be started on the Blue Gouge.

It is reliably reported that the Darling mine, ten miles northeast of here, is to be reopened about August 1st. The water will be pumped and the shaft, now 190 feet, continued to greater depth. There is a good hoist and 10-stamp mill on the property. It is owned, I am told, by Mrs. Whitney of Oakland and A. Gallatin of San Francisco.

Kunce & Mills, in the Stale Mountain district, eleven miles northeast of here, have found an 8-foot ledge of ore that will yield $10 in free gold.

The local lumber consumption in this county during the current year for mining purposes, it is carefully estimated, will exceed 5,000,000 feet. It is all home product.

Placerville, Cal., July 20th.

Inyo.

Independent: J. Basto brought into Independence a few days ago 63 ounces of gold, nearly $1200, the result of a cleanup from the crushing of 12 tons of ore from the Uncle Abe mine, in the Alabama Hills, about 12 miles south.

Kern.

Pick and Pan: Frazier and Bunker Hill mining district, over near where Kern and Ventura counties corner is alive with miners and prospectors who are opening up many prospects. The only mine that has been worked to any extent is the Frazier. The Bunker Hill mine is more developed than any of the latter discoveries, and is bonded to New York men, who have a tunnel in 300 feet.

Times-Index: Between 60 and 70 men are working at Goler. There are twelve claims operated, but in each several men are employed at fair wages and the camp is regarded as reasonably prosperous. While there are no big strikes reported as at the opening of the camp, there is an occasional find of a valuable nugget. A few days ago P. Jackson, who purchased the Bald Eagle No. 2, found a nugget valued at $100. There have been several smaller lumps discovered, the largest of which was worth $20.

Mariposa.

(Special Correspondence).—It is reported that a dam is to be put in the Merced river, eight miles above Benton mills, during the next three months, and an electrical power plant at Benton mills. The Horseshoe mine in Hunter's Valley, E. Thom, supt., has been started up and ore estimated to go about $15 per ton is being milled. At Hornitos the old Kellett mine is to be reopened. Two miles from Hornitos C. E. Stuart is working the Dorse mine and taking out heavily-sulphureted quartz. At Haywards the Sellick mine is being prospected. At the Tyro mine, one mile south of Coulterville, the 10-stamp mill is working ore from the 700-foot level.

Coulterville, July 13th.

Gazette: Hutchison and Henderson have uncovered a vein of ore about two feet in thickness and showing free gold. This find is in the neighborhood of the old Mt. Ophir mine that has not been worked for several years.

The Horse Shoe mine in Hunter's valley has fourteen men at work. They are sinking a new shaft and are now down 100 feet. They have some good ore in sight. A piece taken out recently, about eight inches in diameter, was thickly dotted with gold, there being about $75 worth in the rock.

Nevada.

The Metropolitan mine at Moore's Flat has been sold by Geo. Abraham through Geo. F. Davidson to San Francisco men and is being equipped with a new plant throughout. Water for all purposes is supplied from the Eureka Lake & Ditch Company's ditch, with a head of 400 feet to present millsite. It will be worked through a tunnel. Mr. L. Davis, of Moore's Flat, will be superintendent. Late assays from a 2-foot vein average $25.

Transcript: Turner, Morgan, Tilley and others have sold the Texas quartz mine in Willow Valley to an Eastern company. Work will begin there very soon.

Transcript: Twenty-two men are employed at the Mayflower mine on Canada Hill, engaged in development work, no quartz being taken out.

Telegraph: The new concentrators have been put in the Brunswick mill and the additional five stamps will soon be running.

Superintendent Dawson reports the Gold Hill mine nearly ready to start up. The machinery is on the ground and the buildings are about completed. The shaft is now cleaned out and retimbered.

Herald: The Red Hill quartz mine was ground-sluiced and hydraulicked many years ago, but not deep enough to get the richest of the pay, which was in quartz not placer, as the old miners supposed. The property is now owned by the Red Hill Mining Co., Ld., of Glasgow, and Mr. Trevaskis, the late owner, being foreman of the mine. The ledge is about two feet thick where now worked, and courses from northwest to southeast. It is on the slate and granite contact, the hanging wall being of decomposed slate. The ore averages about $10 per ton. Besides the ledge there is a large and scattering formation of very rich pay dirt, red with oxide of iron. While certain spots in the ledge and in small stringers have yielded thousands of dollars in specimens of pure gold, there are other places where, with only a few inches of ledge matter, this red dirt for 10 or 12 feet around has proved to be all "pay." From one hole, about 20 feet square and 12 to 20 feet deep, $5000 was taken out. Most of this sum was in two tons of ore which was pounded up in a mortar. It is common to find spots where from $200 to $300 is washed out of a single pan of this red dirt, while in the mill large nuggets are found when they clean up.

Placer.

Sentinel: Ralston district is being developed by the French company. They have let a contract for 750,000 feet of timber which will be cut near the mine by a new sawmill. Locations recently made have been added to the property, and roads and ditches are being surveyed.

The Truro Placer Mining Co., principally Colfax people, have incorporated to run a bedrock tunnel to tap a gravel channel about three miles from Gold Run on the American river. J. L. Pearson, F. M. Ackerman, S. C. Jordan, H. Disque and G. D. Wyman are the directors.

J. Manson and J. H. Garbe of Towle have built a four-stamp, water-power mill on their quartz ledge in Bear Valley, near Emigrant Gap.

Plumas.

Bulletin: A quartz ledge from 8 to 12 feet in width of milling ore is reported developed in the lower tunnel of the Four Hills mine.

The Jamison Mining Company has ordered 150,000 feet of lumber to be used in the erection of a 10-stamp quartz mill on their mine above Johnsville.

In the Claybank, above La Porte, an upraise to the channel will soon be made. The indications are favorable for finding the channel, which is the same one worked through the Thistle shaft.

Men are now employed at the Gold Bar mine on the Middle Fork of the Feather.

From La Porte recently $60,000 in gold was shipped. It came from drift and hydraulic mines in the vicinity of La Porte, Plumas county, and Gibsonville, Sierra county.

San Bernardino.

The Rose is reported to have been sold for $100,000 to R. L. Grant of Chicago and O. O. Howard Jr., nephew of Gen. O. O. Howard. Mr. Grant is largely interested in Colorado, having recently sold one at Cripple Creek for $300,000. The first shot after the change of ownership opened up a new body of ore that will run from $30 to $40 per ton.

Shasta.

Free Press: There is considerable activity at the smelter yards of the Mountain Mines, Ld., at Keswick. A blower has been put in to increase the supply of air to the present smelter. A force of men are engaged in laying the foundations and building the framework for three large water-jacket smelters, which will be erected immediately. These smelters will be of the same pattern as those in Denver, Colorado, and Butte, Montana.

J. Salee and H. McDonnell are developing the old Copper City property. They have built seven miles of road to the property, following the old tramway. The old tunnel has been cleaned out and they have run a new tunnel 500 feet. This has cut the copper ledge several times. A bunch of pure copper weighing seven pounds has been taken out, and ore developed worth $30 in gold and thirty ounces in silver per ton besides the copper.

Sierra.

The *Herald* says that Supt. Jones has found another gravel channel in the North Fork drift mine at Forest City. The channel was tapped with an upraise, being eleven feet above the main drift. It is blue gravel and pays $2.50 a carload.

Siskiyou.

Journal: Work is being crowded in the American Bar mine, on Klamath river at the mouth of Ash creek. Forty men are employed and considerable gold is realized along the bedrock.

A large body of ore milling $15 per ton free gold has been struck in the Black Bear mine.

The Gold Bar mine at Sawyer's Bar is employing a large force of miners.

The Quartz Hill mine at Scott Bar is being opened up in a quiet way, after being shut down for several years.

Journal: At the Commodore mine, owned by Billups, Humphreys & Quigley, they have just made a cleanup from a six weeks' run, taking out eighty-nine ounces, about $1600, from seventy tons, which averaged $23 a ton. At present they are using arrastras, but propose to erect a 5-stamp mill about next October.

The ditches and creeks in the vicinity of Hawkinsville are all dry and water cannot be had for mining. The numerous small claims in that vicinity, operated by the Portuguese, were quite successfully worked this season up to the time the water gave out. The water held out longer this year than usual.

Tuolumne.

Democrat: At the Chrystalline mine a new air compressor plant capable of supplying four Burleighs has been ordered.

The new 20-stamp mill of the Jumper is running steadily. Since the Jumper acquired the New Era ground, the New Era and Jumper shafts will be connected by a tunnel.

At the Dutch preparations are being made to put in the new hoisting plant. The ore coming from the 400 level is a high-grade.

At the App most of the ore now being crushed is coming from the 200 level. As the water in the mine is being reduced, a better idea of the ore reserves is obtained. They approximate to those of the Utica.

The Vulture mine, on Whiskey Hill, has been sold to B. M. Newcomb for a company he represents for $6000.

Yuba.

Register: At the Daneborg mine during the past three months the company has made a number of improvements, including a 10-stamp steam power mill, three concentrators run by a separate engine, a new hoisting engine of 75 H. P., a new boiler, 54x16, and a large compressor for machine drills. The company have also erected an office building and boarding house.

Democrat: On the Yuba river near Weed's Point, George Weed & Co. are mining the river bed.

Union: The Blue Point drift mine at Smartsville now employs about twenty-five men. The cement is worked in an arrastra.

NEVADA.

ESMERALDA COUNTY.

Bulletin: The Red Light has six feet of ore which will work $40. About 700 feet from the tunnel entrance, porphyry and quartz have been cut. The formation is soft, while the tunnel has been in lime and serpentine.

Barnes & Keyser are still taking out good ore.

OREGON.

BAKER COUNTY.

The last payment of $10,000 for the Union-Companion mines in Cornucopia has been made and the deeds passed and recorded. W. J. Clark, of Montana, and J. E. Searles, of New York, are the new owners.

Democrat: The Basin hydraulic mine, near Sanger, owned by J. Palmer of La Grande, cleaned up $4000 from a twenty-day run. The total output of the Basin mine is now $20,000 and the yield about $400 per day.

DOUGLAS COUNTY.

Plaindealer: The Victory mine on Cow creek, this side of Glendale, sold by Capt. Nash for $100,000, is pronounced one of the best mining properties in the State. A 48-hour run of one giant produced $500. When the steam pump has been repaired the water of Cow creek will keep the giant running continuously. The mine is a bank of red pay dirt, 70 to 80 feet high, whose extent has not yet been determined, but there is sufficient now in sight to continue operations for a lifetime. Preparations are being made to increase the output by increasing the water supply. Fifteen men are employed.

WASHINGTON.

The gold and silver output of the Monte Cristo Company's mines for the last two weeks is the largest made in the Monte Cristo mining district. It consisted of 21 cars of concentrated and 3 cars of unconcentrated ore. The value of the shipment was about $56,000, and the ore was sent to Everett for smelting. The concentrates were from the Mystery mine and the upper workings of the Pride of the Mountains. The unconcentrated ore was from the lower workings of the Pride of the Mountains, in which the strike was made several weeks ago.

Messrs. Lesage, Massi and McDonald, with a crew of men, are doing extensive development work on the Homestake and Wild Cat mines in the Deer Creek district, near Silverton. These are undeveloped copper properties owned by Messrs. Cleveland and Kline, of Monte Cristo.

Index: A strike of free gold has been made in the Little Giant, situated in the Pierre lake camp, in the Reservation country. The gold is in a well-defined vein about two feet in width, which is free milling. This discovery is near the big copper lead.

News: Fifty men will be put to work at Deer creek at once. Horses will be used to pack ore to the railroad for shipment to the smelter. There are 5000 tons on the dump.

Post-Intelligencer: On Money creek, King Co., the largest force of men is probably employed on the Apex, Milwaukee group, distant about 6½ miles from the Great Northern railway. The group was located in 1892 by the present owners and was the first in the district to be opened up and made to pay. The lead is well-defined a distance of 4800 feet, comprising four claims. The vein in the tunnel already driven is from two to five feet in width. The main pay streak, generally on hanging wall, is from two to eighteen inches wide, and composed of solid sulphides of iron, lead, antimony and zinc, carrying from one to three ounces of gold and from five to 126 ounces in silver. An average assay of the ore already taken out this season went over $60 in gold and silver. At present there are eight men working, taking from one to three tons of ore per day out of the face of the tunnel and stope. When sorted and sacked it is packed to the Great Northern railway, thirty pack horses being employed.

It is reported that gold has been discovered in the beach sand, four miles east of Port Angeles. A single pan of the sand is said to have yielded seventy-five colors and that with an ordinary rocker a man can take out $2 a day. Old settlers say that the beach at this same point was mined for gold twenty

years ago, and at that time miners made good wages.

BRITISH COLUMBIA.

Miner: An 8-inch pay streak on the Northern Belle No. 2, Slocan, assays 136 ounces in silver and 30 per cent lead.

The Wonderful is being ground sluiced to find the lead. Float ore is now being shipped. The property was recently stocked in Spokane for $1,000,000, and the shares are now said to be firm at 25 cents.

The Washington has shipped a carload of concentrates. The mill is working the dump, estimated to hold 25,000 tons. It is expected to ship a carload a day.

Tribune: The O K was the second mine in Rossland to make a shipment of ore over the Columbia & Western. The returns have been received from the Trail smelter on a carload of concentrates, and they show $89.70 in gold and $11.50 in silver per ton.

The Le Roi Mining & Smelting Co. is now sinking a shaft from the 450-foot level and will continue it for 100 feet. One hundred tons of ore are being taken out of the mines daily and there are 10,000 tons on the dump.

The Red Mountain tunnel, 40 feet in, has cut a vein of shipping ore. Two shafts are being sunk on the vein, and the property is presenting an appearance equal to any in the camp.

Journal: The Horsefly hydraulic mine, Cariboo, shipped $9300, being only a partial cleanup and making for the season to date between $17,000 and $18,000. A cleanup at the Cariboo mine will soon be made, and the Horsefly will clean up again the last of July.

ALASKA.

News: Arrangements are being made to commence development on the Alaska-Willoughby company's claim at Funter bay. Shafts are to be sunk in several different places to a depth of 200 feet, with levels at 100 feet and at the bottom. The sinking will be done on the ledge, the ore taken being milled. Stoping ground will be opened up and the mines put in shape. As soon as the work is completed the company will, if the development proves satisfactory, add twenty stamps, making a 30-stamp mill The ore of the Shelp claim at Snettisham bay is so rich that the mine has paid its way since it was located. An arrastra is under construction at this mine.

The Sum Dum and Snettisham bay districts are attracting prospectors this season. In the former, new finds are being made of ore similar to that of the Bald Eagle.

The 30-stamp mill of the Juneau Mining Company, in the Basin, is now in operation, running day and night on first-class ore.

News: The Alaska mineral belts formation is of alternate striatas of slate, granite, limestone, porphyry and, in some localities, sandstone. The gold-bearing veins are associated principally with slate and granite, and those of silver with limestone and porphyry, although both metals are found together and more or less in all the formations, except the sandstone. The country rock of the Yukon is principally slate. Nothing but placer mining has been attempted there as yet, although gold leads certainly exist, as much of the placer gold taken out has gold quartz sticking to it. On the Copper river and at Golvin bay the formation is principally limestone, porphyry and slate. Silver and copper ores are known to exist there, and placer gold has been found.

UTAH.

Record: A seam of ore in the Lucky Bill, at Park City, has been struck which averages $45 per ton. The ore makes on the foot wall of a vein fully 4 feet wide and dips from the drift in which it was struck toward the shaft, on which sinking has been started to tap the vein deeper.

The Anchor, at Park City, which has several veins within its lines, has found ore that is rich and has the strike and dip to keep it on the Anchor ground, instead of running into the Daly West ground, as previous strikes have done. Much of the ore recently uncovered is free milling and carries very little lead, while it is thought the entire vein will show an average of about fifty ounces in silver, with a fair percentage of lead.

At the Daly West prospecting and dead work are being done in the mine, but no hoisting, on account of changes and additions to the hoisting plant and buildings now in course of construction.

The Silver King continues to take out ore and pay its regular monthly dividend.

Stringer Bros., who are jigging near the Crescent concentrator, shipped 40,400 pounds of jig ore last week.

The McIntosh sampler shipped 2,170,000 pounds of ore and concentrates from Park City during the week ending July 18th.

Tribune: The Yankee Girl at Silver City has its first carload of ore at the sampler, and another producer is added to Tintic's already long list. The property is located in the town and has been idle for several years till E. E. Jones made further development. But a few shots were fired before the vein was encountered, and since that time it has steadily improved, the ore consisting of a fine galena, running high in silver and lead and in sufficient quantity to enable a steady output to be kept up.

An important strike in the Shoebridge-Bonanza is anticipated from ore being taken out. The ore consists of a galena, resembling very closely that which prevails in the Swansea and others in that locality, some of which has yielded about 100 ounces silver and 25 per cent lead per ton. The property was obtained but a short time ago by the present company, though in early days it was productive, yielding several hundred thousand dollars before it was abandoned. The present company made a thorough test of the old dump, to learn that with jiggers it could be profitably handled. Exploring the property through a new shaft at a depth of about 100 feet they struck an ore body, the extent of which is not yet determined.

MONTANA.

Inter-Mountain: On Wisconsin creek, Madison Co., above the Leiter mine, the Montana Gold Mining and Milling Company is preparing to start the 12-stamp mill, idle for several years past. During the past winter the company has opened up base, silicate and black manganese, ore carrying gold.

Below Leiter's a few miles, a Dillon company is hydraulicking the gravel of Wisconsin creek. The company has expended about $10,000 and is now within 20 feet of bedrock. It is claimed that even at the present depth the ground pays wages to the men.

There is a great deal of activity in placer mining about Alder gulch this season.

At a meeting of the directors of the Iron Mountain Mining Company at Helena it was decided to run a tunnel 5600 feet in length to tap the shaft of the mine at a depth of 1600 feet. It will cost about $70,000 and will take a year to complete. By working through the tunnel the mine can be operated at a saving of at least 25 per cent over present cost. The tunnel will be 8 feet wide, 7 feet high and double tracked. The regular monthly dividend of a cent a share has been declared for July. It amounts to $5000. The company has about $40,000 now in the treasury to begin work on the tunnel. The net output each month runs from $8000 to $15,000.

World: At present there is but little work being done on the porphyry dike, and, with the exception of M. Manual's property, the others are closed down. The question is not "ore in sight," but one of economical milling. The ore is very low grade, averaging from $2.50 to $4. The dike is 600 feet wide and several miles long, and at the bottom of the 100-foot shaft of the Pauper's Dream claim the ore is of the same character and grade as on the surface. The cost of mining and milling was in the neighborhood of $2 per ton.

Returns made to the County Assessor of Silverbow county by fourteen mining and smelting companies aggregate $3,634,606.76 as the net profit of operation for the preceding assessment year.

Miner: The Elmira, a prospect lately discovered at Clancy, on Legal Tender hill, is now in the windlass stage of development. The shaft is down 25 feet and has yielded two and one-half tons of ore that will go 200 ounces. At the bottom of the shaft the streak of shipping ore is from 6 to 14 inches in width. Sinking will continue until a depth of 50 feet has been reached. Should the mine hold out at this point it will be developed more extensively.

Independent: The Eva May is shipping about fourteen tons of concentrates a day. The Eva May has immense ore bodies and employs a large force of men. Capital is becoming interested in the Cataract district, and there is every prospect that several big mines will be opened up there this summer.

The Blaine & Garfield Company is resuming work, stoping out ore and doing development work. The Blaine has been closed for four years, but the road built last fall will enable the mine to work now at a good profit. In 1887 ore was hauled to Wickes at a cost of about $5.50 a ton, but it can now be hauled to Basin and loaded on the cars for $1.50 a ton.

SOUTH DAKOTA.

The first three carloads of ore shipped from Danialson fraction lode on Yellow creek, yielded over $1300 per 20-ton car. The present output is from thirty to forty tons per day.

The Ninth Cavalry M. Co. have contracted sinking their 65-foot shaft 50 feet deeper. The mine is near Rochford, on a large vein of ore.

A discovery of high grade gold ore has been made by G. Coates on his claims near Hill City, adjacent to the Cowboy tin mine.

The first carload of ore from the Anchor and Balmoral property, situated near Ragged Top mountain, has gone to the D. and D. smelter. From assays made, the carload will yield between $2000 and $3000.

Times: The Wasp Mining Company, in the Yellow Creek district, has discovered a fine body of siliceous ore lying below the quartzite. The ore lies flat, similar to the formations above, and is of the same general character as the siliceous, highly oxidized ores of this district. It is of much higher grade than the ore above, running $130 gold per ton, on an average, and there appears to be a large quantity of it. The ore was only recently discovered, and consequently has not been developed yet. It is the intention of the owners to sink through the ore and crosscut the shoot. It has been discovered also that the footwall was solid ore of high grade. The generally accepted theory among mining men has been that the quartzite was the foundation of the siliceous ore formation; that there was no use sinking below the quartzite, as no siliceous ore would be found. This discovery then appears to upset this theory, and has thereby added importance. The *Times* reported, a couple of weeks ago, the discovery of a flat body of siliceous ore on Squaw creek. The report excited interest and many mining men visited the ground and found the vein to exist just as reported. Some mining men have volunteered the opinion that siliceous ore deposits exist below the quartzite, but that they are vertical veins. They believe the siliceous ores were thrown up from the source of precious metal, through seams in the quartzite, and were then flattened and spread out by water. But these two discoveries have contradicted such theories, as the ore deposits are found to be flat and quite similar to regular shoots, now so clearly located and defined.

There certainly has been wonderful advancement in the methods of developing our mines in the past two years, and the results of the deep mining have proven of inestimable value. There is no longer any speculation or doubt about the existence and uniformity of the ore zones, and mining at present is simply a business proposition. However, there is yet much to be learned, even by those who have given the closest application to the industry.

Pioneer: The new camp on Castle creek, Pennington Co., is at the junction of Middle and Main Box Elder creeks. The ore bodies are large and the ore, which is talc and granulated quartz, is the freest milling of any discovered in the Hills. Pan tests of surface and float give $2.50, and at a depth of ten feet it runs as high as $4.

Review: The Overland mine near Clancy, operated by Essler and Stahl, is shipping a carload of ore per day to East Helena, the lowest returns from which have been $800 per car.

A new mining camp called Sylvanite has been opened in the Kalispel country and is very promising. The Goldflint is one of the chief mines of the district.

COLORADO.

At the Sleepy Hollow mine, Gilpin Co., a hoisting plant is being put at the 800 level, and the east and west drifts at this depth have been started. In the shaft they have a vein 4½ feet wide. Twenty-two men are now working in the mine. Daily shipments of from 60 to 70 tons of ore are made to the Eagle mill.

Writing from Colorado Springs, under date of the 17th inst., F. H. Pettengill says: "It would almost seem that the market will never reach bottom—down, down, they all seem to go—and those whom we would naturally expect would brace it look on with apparent indifference, or they industriously take hold and help bear everything, seeming to forget that a lower quotation means a narrower market, absence of confidence and a shrinkage in one's assets. Now there is no use of anyone becoming disheartened; stocks are all right and will recover. The main trouble is Colorado people allow themselves to be influenced by New York's stocks, which at present seem to be slowly going to nothing—election, silver agitation and various other complications. In my opinion, mining stocks are far better securities for a hold than two-thirds of the listed stocks on the New York Stock Exchange; they are subject to fewer manipulations, fewer re-organizations and numerous other diseases all too common to New York stocks.

Republican: For the past four months almost weekly note on the progress of development in the ground of the Arcadia company at Cripple Creek has been reported, and the property is now showing fully as much strength and greatness as did the Independence under the same amount of development. The shaft is down 135 feet; there is one level 70 feet and another 48 feet in length. The ore was entered at 35 feet from the surface and from there there is a continuous and regular body, with all headings still in ore and a decided widening and improvement in the body with every foot advance. From 12 inches the high grade ore has widened to 30. The lowest shipment ever made from the mine ran 2.7 ounces to the ton, and the average is above $100. Last month the property cleared $147.50 a day from development work and the run this month is much higher. Ore carrying as much sylvanite as any from the Independence is now being mined, and an average assay across a 16-inch streak of it gave above $9000 a ton a day or two ago. Twenty feet north of the Arcadia shaft Tutt, Penrose & DeWitt are getting the same ore, and from the dip of the chute the Abe Lincoln shaft of the Marinette company will undoubtedly come into it with depth.

In the Annie C., in Swift Water district, about a foot of fine sulphide ore, which comprised what has always been considered the foot wall, has been found. A wide streak of mill ore and a foot of sulphide ore was being followed upon as being the full extent of the lead. When about 20 feet of work had been finished on this particular lead, it was noticed that what had been looked upon as the foot wall was apparently a blue porphyry formation, and on putting in a couple of shots it was found that about a foot of $100-ore formed a blanket over the true wall, which is now partly uncovered.

Republican: In the Sneffels district a strike has been made by Bridenstein, Hubely and Clark in their Gertie lode. A vein of twenty inches of ruby and brittle silver was developed. Work has not progressed far enough to ascertain the value definitely of the ore yet to be taken out.

Ouray shipments during the month of June amounted to 162 cars, within three of the May shipments, the latter being the largest on record. This number added to the Red Mountain output makes a total of over 400 cars.

The Benedict will ship a car of good ore, and other shipments will soon follow.

The Melvina, Gold Hill mining district, Boulder county, is progressing and will commence shipping ore soon. In the 400 foot level an 18-inch streak of ore has been found that is gradually widening out. In the center of this is a 2-inch streak with sylvanite all through it, while many pieces are mottled all over with free gold. Workings north of the tunnel are also coming into sylvanite. A sample made of third-class ore gave a return of $115.50 to the ton.

NEW MEXICO.

Gazette: The Victor mine, at the head of Colla canyon, Cochiti mining district, in New Mexico, has been bonded to Colorado parties for fifteen months for $50,000. The owners are to receive, in addition, ten per cent of all ore valued at $30 and fifteen per cent of all ore over $500 per ton taken from the property in the fifteen months. This lessee agrees to put in thirty days' work each month for fifteen months.

Enterprise: In the Chance mine, Central district, 150 feet down the vein has increased in size and value, and considerable quantities of ore are being extracted.

The Lost mine ore chute continues to increase in richness as development work progresses.

On the Golden Gate claim, Pinos Altos, the shaft is down 40 feet; the bottom is in ore, copper and iron pyrite which runs about 15 per cent copper and carries about $9 per ton in gold and silver.

On the Mountain Key the old workings on the several levels from the 300-foot down will be drained and reopened. The two upper levels are producing sufficient gold ore to pay all expenses.

The Golden Giant shaft is down 360 feet. Since the mill was started the output has been from 400 to 600 ounces of gold per month, and about 200 ounces more from concentrates shipped to the smelters. The second level has produced nearly twice as much gold as the first level and the third level twice as much as the second from the same extent of ground worked. Forty men are employed at the mine and mill.

Bell & Stephens are sinking the new shaft upon the Mina Grande mine. It is down 120 feet and will be continued to 160 feet, where levels will be run, the south one connecting with the old adit level. Seven men are employed. On the Pacific the same firm has nineteen men employed. Shaft No. 1 is down 400 feet and drifts are being started on the vein. The ore from the two mines is being stored in the mill yard at the mill, waiting for the water supply of the rainy season.

At Bald mountain Crawford and Woodward have five men at work on the Big Casino mine. The principal value of the ore is in gold.

Messrs. Sapp & Hannas have started work upon the Old Man mine at Camp Fleming, employing five men.

ARIZONA.

Herald: A. L. Butler and A. J. Murphy have six men at work on the Jessie R. group, 35 miles east of Prescott in Cherry creek district. The main shaft of the Jessie R. is down 180 feet on an incline vein. At 85 feet a level runs east 24 and west 60 feet. Another shaft near the west end of claim is down 50 feet, with drifts running east and west on course of vein. The mine is paying working expenses. The last shipment of 18¾ tons is said to have yielded 43 ounces in gold.

The Mammoth mine, J. E. Allen owner, is on a quartz ledge 3 to 5 feet wide. The main shaft is down 140 feet on a 45° incline.

The Rocky Pass mine is now under bond and worked by Williams and Adams of Jerome. The vein is not large but in places rich. A tunnel is in 300 feet and from the tunnel a winze is down 60 feet with drift at the bottom on a fine vein of ore.

Orb: The usual amount of copper, amounting to nearly 1000 tons per month, is being shipped from Bisbee by the Old Dominion Co. About 750 men are on the payroll at present.

At Pearce a project is being considered to work the ore at that place instead of shipping. Samples of the ore are now being tried, and if it is found that the ore can be satisfactorily worked, the old Severns mill will be started on it.

Work on the Tomlinson Hill still continues, and considerable free gold is being found. The Golden Bow and other claims belonging to Tomlinson, Garrett and Sydow are showing up in good shape. The shaft at the Little Jessie, sunk on the top of the hill, showed free gold in an iron-stained quartzite from near the surface, there being no defined ledge. The whole hill is of the same formation; and if the same assays are found in the tunnel which is to be started at the bottom of the hill, Cochise county will have a most promising gold claim.

MEXICO.

Oasis: G. Robinson is working the tailings at La Mina Barranca in the Sahuaripa district. There are some 35,000 tons of tailings which assay twelve dollars in silver and two dollars in gold. They are worked by a new leaching process, and at a small cost yield two-thirds of the assay value. Work was commenced in December, and within the past month the plant was put into operation and is now yielding regular returns.

Don Fortunato de la Vega, who owns rich gold properties at the mining camp of Real de Quebrada Honda, Sinalca, is about to put up reduction works.

It is said that the drowned out mines in Pachuca suffer a loss of at least $200,000 a month because of the water. The San Rafael alone has been known to mine $100,000 per month for export.

Times: The San Domingo placer fields in the Alta river bed, Sonora, Mex., have been bonded for $400,000 by an English company, and $250,000 will be expended in machinery, dams and shafts. The concession is eleven miles long and the dirt is said to average $9 a cubic yard.

La Mina Colorada, Ures district, about thirty miles from the City of Ures, has been sold to a Guaymas, Mex., company. The price paid was $30,000 silver. The mine has produced largely in the past, and is expected to renew its productiveness.

The Mexican Ore Company of Hermosillo, Mex., has placed in its works new and costly machinery, which is capable of smelting forty tons a day.

SOUTH AFRICA.

The De Beers Consolidated Company (G. T. Williams, formerly of Oakland, manager,), which has the largest and richest diamond mines in the world at Kimberley, has declared a half-yearly dividend of 18s per share, and an extra dividend of 4s. With the dividend of 18s declared last December, the total distribution during the year ending June 30, 1896, was 40s per share, equal to 40 per cent on the share capital. This is the highest dividend ever declared, and at the same time the reserves of blue ground, in which the rough diamonds are found, are announced to be greater than ever. The quotation of the £5 shares is now £31. The gross profit for the year was £2,248,000, and the net amount available for dividends was £1,900,000.

Journal: The total output for May on the Rand was 195,008 ozs., an increase of 21,000

ozs. over April. The following were the leading producers: Robinson, 17,049 ozs.; Ferreira, 13,115 ozs.; Crown Reef, 10,939 ozs.; Langlaagte estate, 9323 ozs.; New Primrose, 9004 ozs.; Simmer and Jack, 8654 ozs.; City and Suburban, 8350 ozs.; Henry Nourse, 6297 ozs.; New Heriot, 6033 ozs.; Geldenhuis estate, 5897 ozs.

Coast Industrial Notes.

—The Shasta County supervisors have ordered the construction of another bridge across the Sacramento river at the mouth of Cottonwood creek.

—The electric light and power plant of the Tuolumne E. & P. Co., on the Stanislaus river, was seriously injured by a bolt of lightning last week, the dynamos being burnt out and the machinery being otherwise injured.

—In Santa Barbara Co., Cal., the Ojai Valley Railroad construction will begin September 1st. A subsidy of $10,000 has been given by the inhabitants of the valley, and the necessary right-of-way secured. The construction is in charge of Captain Cross.

—A broad gauge lumber railroad seven miles long is being constructed by the Sierra Nevada Wood & Lumber Co. from Truckee to Overton, a new lumber camp. There are seventy men employed grading and clearing, and it is expected to complete the road within the next thirty days.

—John W. Ferris, 320 Sansome street, San Francisco, has had 150 men with a large excavating plant at work for two years removing hills and grading a 45-acre tract in the southwestern part of this city, making 500 building lots, to be ready for street work and construction Jan. 1st, '97.

—The Union Iron Works, at the request of the Japanese Government, has submitted bids for the construction of two high-class cruisers for its navy. At Washington, where the bids were opened by the Japanese minister before being forwarded to Japan, the impression among the naval experts is that the Union Iron Works will secure the contract on one if not on both.

—During June merchandise was shipped East from Sacramento by the S. P. Co. as follows: The figures represent tons: Borax 61, brandy 19, canned goods 50, cattle 3315, dried fruit 14, green fruit 4224, hides 26, hops 13, horses 54, leather 112, lumber 118, miscellaneous 259, ores 1108, potatoes 567, powder 42, rice 32, saddlery and harness 4, canned salmon 18, vegetables 718, wine 567, wool, grease 132, wool, pulled 19, woolen goods 1; total, 11,473.

—During the fiscal year ending June 30, the receipts at the U. S. Custom-house in this city aggregated $5,526,535.34. The exports of merchandise and treasure were as follows: Domestic—Merchandise, $31,127,452; treasure, $7,326,597; total, $38,454,049. Foreign—Merchandise, $465,904; treasure, $6,291,476; total, $6,757,380. The expenses of the collector's office for the year aggregated $358,869.98. There are 256 employes, the annual salary list being $228,629.67.

—The South Yuba Water Co. has commenced the construstion of their storage reservoir dam at Clipper Gap, Placer county. The reservoir will cover 40 acres and hold 21,000,000 cubic feet of water. The dam will be 426 feet long, 150 feet width of base and 42 feet high, the construction being of earth and puddle. A large number of men will be employed. The object of the construction is to protect the development of electrical power for transmission to Sacramento from danger of interruption by breaks in the long lines of mountain ditches above the reservoir.

Personal.

J. B. TREADWELL is at Nevada City.

W. L. AUSTIN is sojourning at Globe, Arizona.

JAS. H. KINKEAD has returned from Needles, Cal.

J. H. TIBBITS has returned from Buluwayo, South Africa.

R. F. HARRISON, manager of the Rose mine at Victor, is in the city.

J. B. FARRISH, M. E., who recently returned from Mexico, has gone to London.

PASCAL GARNIER, a French mining engineer, is in this city en route to Coolgardie, Australia.

BARRY SEARLE goes to South Africa to take charge of the Crown Deeps property, Johannesburg.

GOULD & CHALMERS have been awarded a contract for making a complete plat-book of Mono county.

JULIAN SONNTAG has been elected president of the Manufacturers' Association, Horace Davis resigning.

GENERAL WADE HAMPTON, U. S. Railroad Commissioner, is in San Francisco on his annual inspection of Government aided railroads.

W. HAMMOND HALL is the deserved recipient of the Norman medal for '95, awarded by the American Society of Civil Engineers for his recent paper on the Santa Ana canal.

"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colo.

Commercial Paragraphs.

THE Pacific Sheet Metal Works, 209 Mission St., now daily make over 400,000 cans for packing salmon, fruit, etc.

THE Risdon Iron Works of this city have the contract for the new electric plant at Ogden, Utah. Five Knight wheels will be used.

THE new smelters for the Mountain Mines Co., building by the Fulton Engineering and Shipbuilding Works, are in process of completion.

THE Bald Eagle Mining Co. of Sum Dum, Alaska, have placed orders for a second shipment of Springer six-foot canvas belt concentrators, and Supt. Trowbridge says they are doing first-class work.

THE John Taylor Co., 63 First St., S. F., are manufacturing a combined crucible and muffle furnace that takes a 12x6x4 or "J" muffle and No. 10 or equivalent size crucible, that admits of using either coke or coal as fuel.

THE B. C. Iron Works Co., Vancouver, B. C., ask for exemption from taxation on extensions, and say that $100,000 will be spent on a marine railway, $125,000 on the extension of the present works for manufacturing machinery and $100,000 addition to working capital. They propose to employ 200 men.

RECENT sales by the Dow Steam Pump Works are an electric driven triplex plunger pump for the Banner mine, Butte Co.; an underwriters' fire pump for the Sierra Lumber Co., Red Bluff; a sinking pump for the S. C. G. M. Co., Placerville, Cal.; a combined air and circulation pump for the steamer Barclay Golden.

THE Pelton Water Wheel Co. have the past week made the following shipments: A 200 H. P. wheel for the Mountain Mines in Shasta county, a 160 H. P. wheel and accessories to the Juneau Electric Light Co. in Alaska, a 250 H. P. wheel for the Garnet mine in Montana, a 150 H. P. wheel for the Heppner Flour Mills in Oregon, a 400 H. P. wheel for the Michoacan Mining Co. in Mexico.

Recent California Mining Incorporations.

Oregon G. M. Co., San Francisco. Directors—J. O'B. Gunn, D. Wilson, J. Champion, S. F. Grissim, B. C. Brown, all of San Francisco. Capital stock, $1,000,000; $2500 subscribed.

Red Cap M. Co., San Francisco. Directors—C. A. Hooper, D. C. Henry, J. E. Sims, E. DeK. Townsend, H. M. Buckley, F. Riffle, W. B. Morris. Capital, $20,000, all subscribed.

The Alcalda Oil and Mineral Ass'n, Los Angeles. Directors—J. F. Hall. W. H. Gilbert, W. R. Myers, E. Riggin, E. J. Bullingham, G. W. Halk, A. Scharff. Capital stock, $700, all subscribed.

Demi Centum Development and Prospecting Co., San Francisco. Directors—A. G. Comstock, L. Burden, B. P. Uklin, T. Willward, G. Griffith, J. W. McAdoo, J. H. Robinson, W. W. Young, G. F. Klatt, W. J. Norwood, J. F. Young. Capital stock, $50,000; $20,000 subscribed.

Emery Drift Gravel M. Co., San Francisco. Directors—L. J. Kimball, F. Hiller, C. L. Benton, C. Rickoff, G. T. Emery. Capital stock, $50,000; $40,000 subscribed.

Potosi Lead and Silver M. Co., Los Angeles; capital stock, $100,000, all subscribed; J. L. Green, E. W. Doane, E. D. Herman, A. J. King, T. Lentze, Los Angeles.

Recently Declared Mining Dividends.

THE Bangkok-Cora-Bell mine, Colorado, paid a $6000 dividend on the 13th. The same day the Calumet & Hecla copper paid a $500,000 dividend.

THE Cariboo, B. C., mine paid a $16,000 dividend on the 7th.

THE Golden Fleece, Colorado, mine paid a dividend of $18,000 on the 15th.

THE Alaska-Mexican Mining Company this week declared a quarterly dividend of 10c per share, $18,000, payable next Tuesday.

THE Alaska-Treadwell Mining Company this week declared a quarterly dividend of 37½c per share, $75,000, payable July 28th.

THE Mercur, Utah, mine paid a $25,000 dividend last Monday.

THE Mammoth, Utah, Mining Co. will pay a $20,000 dividend next Saturday.

THE Ontario, Utah, Mining Company will pay a 10-cent dividend, $15,000, July 31st.

THE Boston & Montana Mining Company, Montana, will pay a $3 dividend, $450,000, August 20th.

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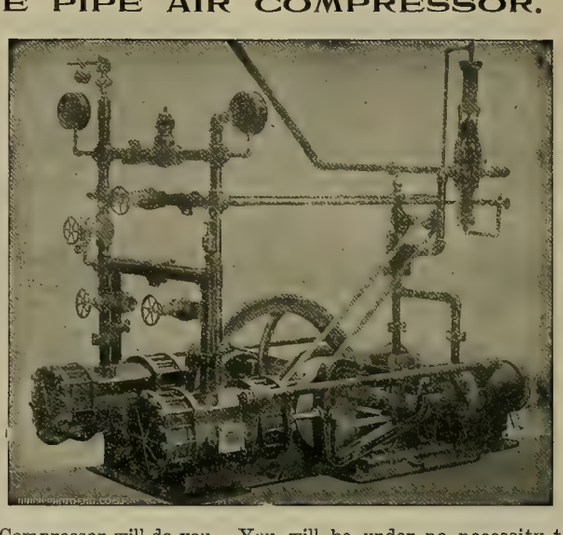

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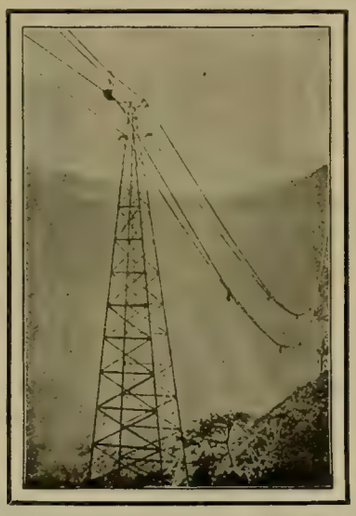

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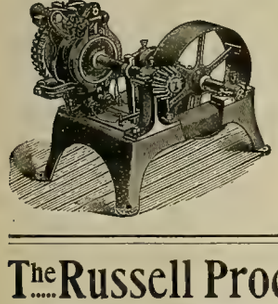

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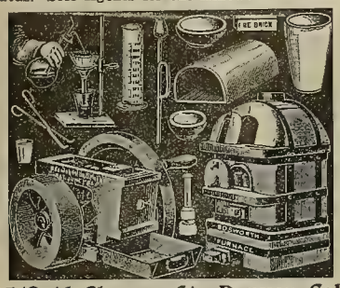

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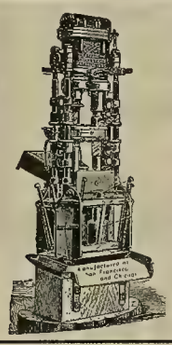

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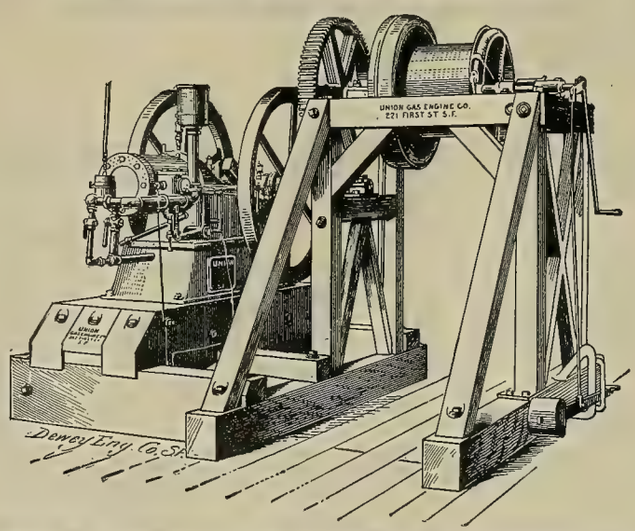

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The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis. The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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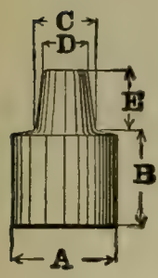

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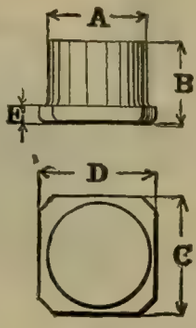

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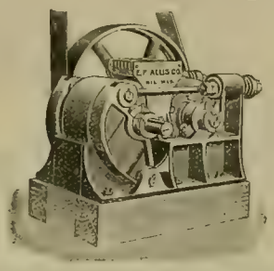

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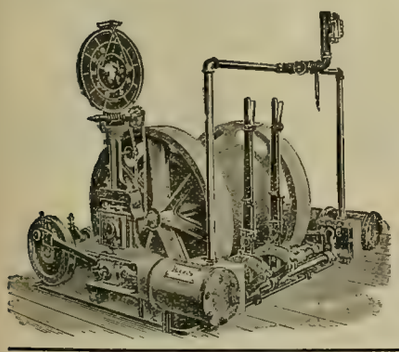

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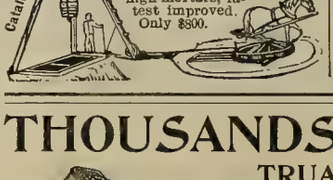

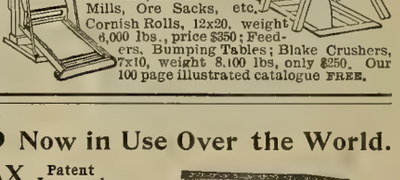

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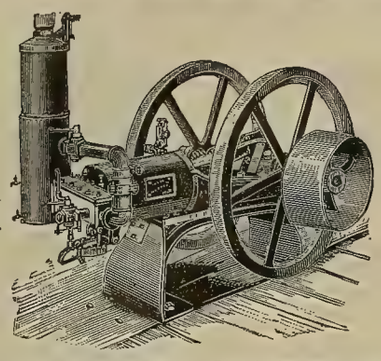

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Coal Oil, ten hours' run, 7½ gallons @ 10c.	75
Crude Petroleum, asphaltum base, 16 gallons @ 3c.	48
Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c.	65

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon=21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

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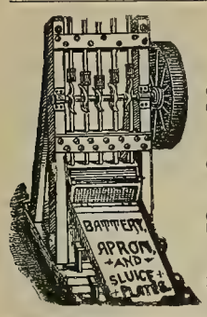

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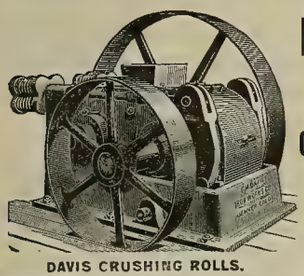

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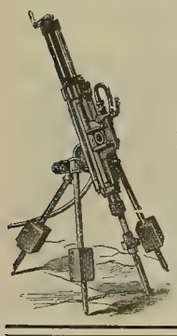

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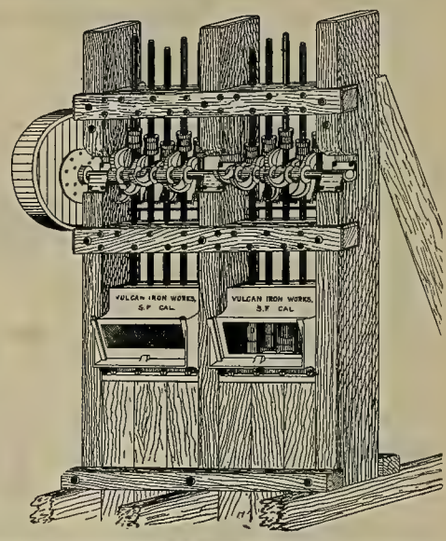

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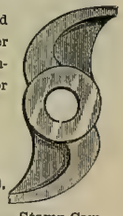
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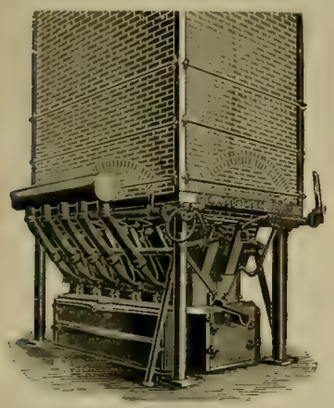

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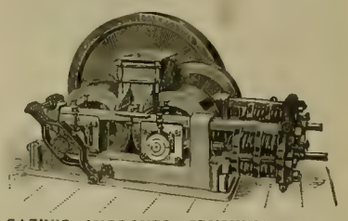

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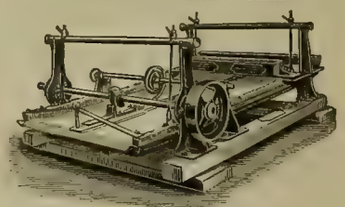

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Market Reports.

The Markets.

SAN FRANCISCO, July 23, 1896.

Jobbers report a large increase in the volume of goods going out over that at the like-time last year. The different transportation companies corroborate the above but say that the increased movement comes from the mining districts in California and Pacific coast States in general. The strength displayed by wheat so early in the harvest season is having a beneficial effect. It gives encouragement to the belief that many producers will be able to cancel a part if not all their obligations. The prices ruling for fruits admits of a fair profit to the grower. Manufacturers, considering the time of the year, are fairly busy.

The local money market continues easy with gilt edge paper quickly taken by the banks. The latter still discriminate closely, which allows outside lenders to place funds at good rates. Money continues to seek this coast for investment in gold mines but owners of good propositions are slow to let go except at higher prices than was asked a year ago. From the East our advices are to the effect that money is firmer caused by the outflow of gold to Europe, but the action of the banks in coming to the relief of the Government until crops begin to move is having a favorable influence. Business at the East is said to be quiet but not more so than usually obtains at this season of the year. Owing to prominence given to silver by the political parties in this country, and the interest taken in the subject by all classes, the present position of silver, so far as the United States is concerned, is for account of the Government. There is practically no coinage of legal tender silver dollars, except from the bullion securing the Sherman "Treasury notes," and these silver dollars are only coined to redeem these notes, and when so redeemed they are cancelled. Of the total issue of Treasury notes (which reached the maximum of $155,931,002) there has been redeemed to July 1, $26,247,722. Fractional silver coin is of course coined only for the account of the Government according to the needs of circulation. It is legal tender only to the amount of ten dollars. The standard weight and fineness is lower than that of the standard dollar. The weight of the latter is 412½ grains and the fine silver therein is 371¼ grains, while the fractional coin is of a weight equivalent to 385.8 grains to the dollar and the fine silver therein is 347.22 grains. Although silver standard dollars are legal tenders for all purposes to any amount, the "silver certificate" of deposit issued by the Treasury against these dollars is not legal tender except for customs and taxes and all public dues. By tacit consent of the banks, they are not considered clearing house funds. Silver certificates are redeemable by the Treasury only in standard silver dollars.

New York Silver Prices.

NEW YORK, July 23.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	31 7-16	68¾
Saturday	31½	68⅞
Monday	31 7-16	68¾
Tuesday	31½	68⅞
Wednesday	31½	68⅞
Thursday	31½	68⅞

	Copper.	Lead.	Iron.	Tin.
Friday	11 25	2 95	10 75@12 50	13 50
Saturday	11 25	2 90	10 75@12 50	13 50
Monday	11 25	2 90	10 75@12 50	13 50
Tuesday	11 25	2 90	10 75@12 50	13 50
Wednesday	11 25	2 90	10 75@12 50	13 50

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, ¾ per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	5
New York Telegraphic Transfer	7½
London Bankers' 60 days	$4.88
London Merchants	$4.86¼
London Sight Bankers	$4.89¾
Refined Silver, per oz., 1000 fine	68⅞
Mexican Dollars	54@55c

SILVER.—The market on this coast and also at the East is quiet but fairly firm. Shippers only take for pressing wants, claiming that prices in this country are too high for profitable shipment. There is some buying for speculative account by parties having idle money, who believe in better prices later on.

MEXICAN DOLLARS.—There is a fair inquiry but not up to what had been expected would rule in this month for export to the Orient.

COPPER.—The market is quiet. There is strong probability that Japan may have two war vessels built in this city, which will increase the consumption. The East reports quiet but fairly firm markets. In their last circular letter James Lewis & Sons, Liverpool, say: "The firm who have recently bought so largely have quietly continued their purchases whenever they could do so at cheap rates, and must now have control of a quantity approximating 20,000 tons. The total stock of Chili bars, which practically means that of G. M. copper, in England now amounts to only 25,627 tons. Stock taking has somewhat diminished deliveries, the decrease in English and French stocks for the month of July being 1021 tons. From 41,528 tons on the 1st of January the public stocks in England have diminished during the half year to 28,393 tons, or 13,135 tons, while during the past twelve months the diminution amounts to 24,059 tons. There must also have been a considerable reduction in the quantity at the works of smelters and manufacturers. The branches of trade which consumes copper continue very active, shipbuilders, locomotive engineers, dynamo makers, and wire drawers being especially busy."

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The market is practically unchanged.

The market is quoted as follows:

Home trade, per flask	37 00
Distant points up north	36 25@37 00
West coast of Mexico, for export	34 50

ANTIMONY.—The demand is slow, with the market easy at 7¾@8¼c in a jobbing way. New York mail advices quote 7⅜@7½c for Cookson's, 6½c for Hallett's and 6½c for Japanese, from store.

LEAD.—The market is quiet. The largest consumer in this city has imported quite a quantity. It is said that it will cost more than if domestic had been bought, unless it is worked up into lead in bond for export, then a saving is made.

Pig	3 75	@	4 00
Bar	—	@	4 15
Sheet	—	@	5 50
Pipe	—	@	4 75

SHOT.—The market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—The demand is slow, but the market holds steady.

Pig, per lb	14½c
Plate, I C coke, heavy, per box	$4 25
" " " light, "	4 10

BORAX.—The market is quoted as follows

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	6⅛
Concentrated, "	5⅝

POWDER.—The market is firm at quotations with a continued free consumption.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

IRON.—The market is reported firm with a continued good consumption for the season of the year. At the East the market is said to be easy, with a lessened demand, but this always obtains at this season of the year.

Our market is quoted as follows:

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 50
Gartsherrie	21 50	23 50
Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c	
Lake Superior Sheathing		20

COAL.—There is absolutely nothing new to report since last week's issue.

SPOT FROM YARD—PER TON.

Wellington	7 50@	8 00	
Greta	6 00@	6 50	
Nanaimo	6 50@	7 00	
Gilman	5 50@	6 00	
Seattle	5 00@	5 50	
Coos Bay	— —@	4 50	
Cannel	— —@	8 50	
Egg, hard	— —@	11 50	
Wallsend	— —@	7 00	
Scotch Splint	— —@	7 50	
Brymbo	— —@	7 50	

TO ARRIVE—CARGO LOTS.

Australian	5 50		
Liverpool Steam	6 25		
Scotch Splint	— —		
Cardiff	6 25		
Lehigh Lump	9 00		
Cumberland	13 00		
Egg, hard	10 00		
West Hartley	6 50		

COKE.—The market is quoted as follows:

Gas Companies'	— —	— —	
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—The home demand is said to be quiet, but there is good shipping movement.

The market is quoted in this city from dock or yards as follows:

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is quiet. Dealers do not anticipate wants, under the belief that the market will go lower.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, July 23, 1896.

The market fluctuated to lower prices the past week. Trading has been only fairly active, and at each decline there was more or less selling by outside holders. The large proportion of those that sold were on a margin and compelled to this course so as to strengthen their account. It is stated that quite a number of holders having cash shares also sold under the belief that they could buy back for less money before another advance sets in. The decline was brought about by those manipulating the market not giving it any support. Notwithstanding this, it is a well-established fact that the shares sold drifted into the hands of those who have taken them out of the market, which has made several quite scarce and exceedingly sensitive to any demand from outside buyers. At yesterday's low prices, when Chollar sold at $1.80, Potosi at 90 cents and Con. Virginia at $1.55, the shares of the north-end and Gold Hill mines were as low as they were when the Chollar deal began, but Gould & Curry, Savage, Chollar and Potosi were higher. The better prices ruling for the latter is due to the work that is being done on the Brunswick lode and favorable chances for finding quite a body of ore in one or more of them. The work under way in the different mines on the Comstock lode does not attract much attention from dealers, but mining men who profess having knowledge of the lode are watching it with considerable interest, although they say it may take several weeks yet before it will be advanced far enough to warrant asserting whether it is a failure or success. While saying this they are quite sanguine that it will be successful. In the Bodie shares trading was quite active at higher prices under the lead of Bodie, which sold up to 66 cents. It is reported that it is the intention of the new management of Bodie, Mono, Bulwer and Standard to consolidate the mines into one so as to reduce expenses and run them on a business basis and not as a speculative proposition.

From the Comstock mines the news, so far as official advices go, is essentially unchanged. In Alta they are saving some ore while prosecuting the work on the levels heretofore published. In Overman they are raising each week a few tons of ore assaying around $30 a ton. No work, so far as we can learn, is being done in Caledonia. In Seg. Belcher and Belcher a lessened number of tons of ore were raised the past week. The car sample assays were also slightly less. In Crown Point active work is going on around the 600-foot, 700-foot and 1100-foot levels. The most interesting work is to the west on the two first-named levels. We are not advised of work having been resumed in Kentuck and also if they are working in Yellow Jacket. In Confidence they are still raising for air connection. No ore has been extracted for several weeks. No work, so far as we are advised, is being done in Challenge. The joint Challenge, Confidence and Con. Imperial west crossdrift is in over 600 feet. In the latter mine another crossdrift is being run on the surface tunnel level. In Alpha they are still running the southwest crossdrift on the 500-foot level. It is in over 135 feet. The long west crossdrift being run by Bullion is in over 3350 feet. Work is continued in Potosi on the 450-foot level, but nothing new is reported. In Chollar they raised the past week over 90 tons of ore, assaying over $25 a ton. In Hale & Norcross, on the 900-foot level, they are pushing for the continuance of the ore found in Savage. A small stringer of ore was cut which gave a high assay. In Savage the work is about the same as reported last week. Some fair-grade ore is being raised and sent to the mill for reduction. Work is continued by Gould & Curry and Best & Belcher in the joint east crossdrift from the Bonner shaft. Con. Virginia extracted and raised over 100 tons of ore last week, which assayed about $60 to the ton. The work that is being done on the 1000-foot level toward Ophir is being closely watched, as is the work on the same level that is being done by Ophir and Mexican. Work is continued on the Central tunnel level by Ophir. There is no change in the work that is being done in Sierra Nevada, Union, Utah or Andes.

The news from the Brunswick lode is of an interesting and important character, which will soon have a strong bearing on the market. Whithin a few days, some say by Sunday, while others say August 1, the south drift on the 300-foot level in Chollar will have been advanced a sufficient distance to admit of three crosscuts being started at on the same day. The superintendent of the mine stakes his reputation as a miner that he will strike the downward continuation of the ore found above. It is the impression that the vein will be wide and the ore probably higher grade. It is quite certain that with the striking of the ore on the 300-foot level there ought to be better prices for the shares. On the 200-foot level they are running two crossdrifts. In Hale & Norcross work is continued on the east and west crossdrifts on the 300-foot level. They are also pushing the north drift towards the Savage line. They have about 150 feet to run yet before reaching it, but when it does the latter company will continue the drift. In Savage the work reported last week has been suspended. In Gould& Curry the work is said to be of an interesting character. It is being closely watched by experienced miners. Work is continued in the shaft in Best & Belcher's ground. In Occidental work is continued on the 550-foot, 650-foot and 750-foot levels. So far as we are advised there has been no change to report.

News from the Bodie district is about the same as given in last week's issue. A proposition is said to be on foot to pump out the Mono and Bodie shafts by electric power, this being considerable cheaper than if done by steam owing to the high price of fuel. If this proposition should be carried into effect it means a revival of mining in that district.

The market opened this morning firm for the Gold Hill shares, steady for the northends and weak for the middle shares. After regular call considerable strength and activity was developed in the Gold Hill shares, under the lead of Challenge. The advance caused the middle and north end shares to firm up in sympathy. What caused the upmove in the Gold Hills no one seems to know, for there is nothing new from the mines, but an assessment is said to be pending on three of them. The Bodies sold lower, but Occidental sold slightly higher. A winze is to be sunk below the 750-foot level in Occidental. The management of this mine seem determined to find out how far down the ore extends. That found on the 750-foot and the other levels justifies the new work.

The following illustrates the changes of the week:

Mines.	July 16.	July 23.
Alpha	....	$ 15
Alta Consolidated	....	08
Andes	$ 35	27
Belcher	....	40
Best & Belcher	38	40
Bodie	70	53
Bullion	43	60
Challenge	....	17
Chollar	39	47
Confidence	2 60	1 85
Consolidated California and Virginia	....	1 10
Consolidated New York	1 80	1 60
Crown Point	....	03
Exchequer	48	40
Gould & Curry	....	....
Hale & Norcross	88	64
Justice	1 50	1 10
Mexican	....	....
Ophir	62	55
Overman	1 05	94
Potosi	....	20
Savage	1 25	94
Sierra Nevada	80	64
Union	60	54
Utah	51	.....
Yellow Jacket	11	.....
	....	39

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied, Deling't and Sale.	Secretary.
Best & Belcher M Co, Nev	60	25c	July 2..Aug 6..Aug 27	M Jaffe, 309 Montgomery
Bullion Con G M Co, Cal	8	15c	June 16..July 20..Aug 11	C A Grow, Mills Building
Channel Bend M Co, Cal	3	5c	June 23..July 31..Aug 22	J P Langhorne, 39 Sutter
Chollar M Co, Nev	42	25c	June 9..July 14..Aug 4	C E Elliot, 309 Montgomery
Gold Bar Con M Co, Cal	4	2c	July 13..Aug 20..Sept 21	E C Godfrey, Crocker Bldg
Jamison M Co, Cal	8	5c	July 6..Aug 15..Aug 31	Sam W Cheyney, 120 Sutter
Kentuck Con, Nev	12	5c	June 16..July 22..Aug 12	Aug Waterman, 309 Montgomery
Marguerite G M & M Co, Cal	3	10c	June 18..July 28..Aug 28	Chas. Winters, 237 Twelfth
Mono G M Co, Cal	37	10c	June 2..July 6..July 27	M E Willis, 309 Montgomery
Nimshew G M Co, Cal	1	3c	June 5..July 13..Aug 3	C D Cook, Mission St Pier No. 1
Occidental Con M Co, Nev	23	15c	June 2..July 7..July 28	A K Durbrow, 309 Montgomery

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Lady Washington Con Co	J E Jacobus, 309 Montgomery	July 29
North Pacific Mining & Transportation Co.	E D Farish, 632 Market	Aug 17

San Francisco Stock Board Sales.

SAN FRANCISCO, July 23, 1896.

9:30 A. M. SESSION.

400 Alta	08	200 H. & N	1 10
950 Andes	27	200	1 05
100 Best & Belcher	50	100 Kentuck	07
1100 Bodie	60	100 Mexican	51
200	59	200	50
100	58	100 Occidental	60
100 Bullion	17	100 Ophir	91
560 Challenge	42	100 Overman	20
400	41	300 Potosi	93
450 Chollar	1 80	400 Savage	61
150 Con Cal & Va	1 60	100 Sierra Nevada	54
50 Confidence	1 10	300 Yellow Jacket	37
100 Con New York	03	100	38
600 Crown Point	38	200	39
100 Gould & Curry	62		

SECOND SESSION—2:30 P. M.

400 Ophir	94	450 Belcher	40
100 Mexican	55	100 S. B. & M	13
100 Gould & Curry	64	300 Bullion	17
350 Best & Belcher	58	400 Potosi	94
450 Chollar	1 80	200	93
50	1 85	100 Caledonia	14
100 Savage	64	900 Challenge	47
400 Crown Point	40	300 Occidental	63
400	39	100 Andes	27
350 Yellow Jacket	39	1200 Bodie	56
600 Alpha	15		

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JULY 7, '96.

563,552—POTATO CUTTER—O. A. Bulette, Seattle, Wash.
563,712—FILTER—T. A. Evans, Mt. Tabor, Or.
563,465—TRY-SQUARE—E. S. Farley, Pomona, Cal.
563,366—AIR-TIGHT PACKAGE—C. Fricke, S. F.
563,381—BOOK-LEAF HOLDER—N. A. Judd, S. F.
563,280—FARE REGISTER—C. L. Logan, Los Angeles, Cal.
563,393—CAR COUPLING—J. C. Look, San Jose, Cal.
563,507—GAME—R. M. Nuehmias, S. F.
563,682—ANIMAL TRAP—C. L. Parker, Los Angeles, Cal.
563,408—SUPPORTER—J. J. Pfister, S. F.
563,423—CAR—C. W. M. Smith, S. F.
563,514—ROTARY DISK PLOW—Spaulding & Robbins, Stockton, Cal.
563,515—ROTARY PLOW—Spaulding & Robbins, Stockton, Cal.
563,516—WHEELED PLOW—Spaulding & Robbins, Stockton, Cal.
563,430—WINDOW HINGE—R. R. Strain, S. F.
563,436—GAS REGULATOR—W. E. H. Williams, S. F.
563,349—WASHBOILER—I. H. Winget, Stuart, Cal.

FOR THE WEEK ENDING JULY 14, 1896.

563,841.—CABINET—Cavanaugh & Lusberg, Portland, Or.
564,062.—ELEVATOR BASE—G. H. Evans, Oroville, Cal.
563,790.—SCRAPER AND ELEVATOR—G. N. Folsom, Hobart, Nev.
563,952.—FAUCET—S. C. Freels, Hollister, Cal.
564,080.—PUMP—W. P. Keeler, Spokane, Wash.
564,085.—WINDMILL—M. M. Kingman, Chelan, Wash
564,089.—HORSE-COLLAR—R. G. Lehman, San Diego, Cal.
564,091.—VIOLIN BOW—J. D. Loppentein, Orange, Cal.
564,093.—WRECKING FROG—C. K. Marshall, Tacoma, Wash.
564,024.—HYDROCARBON BURNER—Dr. F. McKinney, Los Angeles, Cal.
564,025.—SURVEYOR'S MONUMENT—R. J. Northam, La Miranda, Cal.
563,805.—CONCENTRATOR—W. A. Rockfellow, Baker City, Or.
564,163.—CAN-COOLING MACHINERY—H. Schaake, S. F.
564,116.—OVEN—A. Spangler, Silverton, Or.
563,821.—BICYCLE CRANK—A. A. Unruh, McMinnville, Or.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

REGULATOR FAUCET FOR LIQUID UNDER PRESSURE.—Samuel C. Freels, Hollister, Cal. No. 563,952. Dated July 14, 1896. The object of this invention is to provide a simple and effective faucet, by means of which the pressure in the vessel from which the liquid is withdrawn is reduced and held in check in such a way as to permit the liquid to flow without undue foaming or the presence of the unrestrained gas. The faucet has a conical valve-plug adapted to engage with a correspondingly conical seat, whereby the liquid is permitted to pass around said valve-plug in a thin sheet or film, and in connection with said plug there is a circumscribing wall over which the liquid overflows from around the plug in a thin sheet on its passage to the discharge.

Books Received.

THE *Engineering Magazine* has issued a volume that engineers and constructors of engineering work will appreciate. It is Volume II, 1892–1895, of "The Engineering Index," and has been prepared by experts selecting from papers read before technical and engineering societies and from current technical periodicals—such matter as is thought to have a permanent value, and adding to the title index notes that give a general idea of the scope of the article indexed. With Volume I it makes a complete classified index to the engineering literature of the past eleven years. The index was started by the Association of Engineering Societies, but is being carried on by the *Engineering Magazine*, which will issue the index annually hereafter. The engineering profession will find these volumes of permanent practical value in their practice. The price of Volume II is $4. For sale by the *Engineering Magazine*.

Assessment Notices.

MARGUERITE GOLD MINING AND MILL CO. Location of principal place of business, San Francisco California. location of works, Auburn Placer county, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 18th day of June, 1896, an assessment (No 3) of Ten Cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 257 12th St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of July, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on FRIDAY, the 28th day of August, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

Office 257 12th St., San Francisco, California. Office hours from 4 to 6 P. M.

BEST AND BELCHER MINING COMPANY.—Location of principal place of business, San Francisco. California. location of works, Virginia Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of July, 1896, an assessment (No. 60) of twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 33, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of August, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 27th day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

M. JAFFE, Secretary.

Office—Room No. 33, Nevada Block, No. 309 Montgomery street, San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Little Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 8) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 31st day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of July, 1896, an assessment (No. 4) of Two cents (2c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 38, Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of August, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 21st day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

DELINQUENT SALE NOTICE.

NIMSHEW GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Nimshew, Butte County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the Fifth (5th) day of June, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
D. Gutman, Trustee	19	500	15 00
D. Gutman, Trustee	20	500	15 00
D. Gutman, Trustee	21	500	15 00
D. Gutman, Trustee	22	250	7 50
D. Gutman, Trustee	23	250	7 50
D. Gutman, Trustee	24	250	7 50
D. Gutman, Trustee	25	250	7 50
D. Gutman, Trustee	26	500	15 00
D. Gutman, Trustee	37	500	15 00
D. Gutman, Trustee	38	500	15 00
D. Gutman, Trustee	53	200	6 00
D. Gutman, Trustee	54	200	6 00
Geo. C. Higgins, Trustee	12	200	6 00
Geo. C. Higgins, Trustee	13	200	6 00
Geo. C. Higgins, Trustee	14	200	6 00
Geo. C. Higgins, Trustee	15	200	6 00
Geo. C Higgins, Trustee	16	200	6 00
Geo. C. Higgins, Trustee	74	10,000	300 00
T. F. Boyle	32	500	15 00
M. Olsen	35	1,000	30 00
M. Olsen	148	1,000	30 00
M. Olsen	149	4,000	120 00
J. M. Fletcher	34	250	7 50
T. Thomson	72	1,000	30 00
T. Thomson	73	1,000	30 00
T. Thomson	135	500	15 00
C. M. Martin	66	500	15 00
C. M. Martin	67	500	15 00
C. M. Martin	68	500	15 00
C. M. Martin	69	500	15 00
S. Gerthrude Symth	70	5,000	150 00
Wm. Matson	122	2,000	60 00
Wm. Matson	142	5,000	150 00

And in accordance with law, and an order from the Board of Directors, made on the 5th day of June, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Mission Street Pier No. 1, San Francisco, California, on MONDAY, the 3rd day of August, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

C. D. COOK, Secretary.

Office, Pier 1, Mission Street, San Francisco, California.

ANNUAL MEETING—The regular Annual Meeting of the stockholders of the North Pacific Mining and Transportation Company will be held at the office of the Company room 5, No. 632 Market St., San Francisco, California, on Monday, the seventeenth (17th) day of August, 1896, at the hour of 1 o'clock p. m., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Wednesday, August 12th, at 3 o'clock p. m.

E. D. FARISH, Secretary.

Office—Room 5, No. 632 Market street, San Francisco, California.

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From Emigrant Gap, C. P. R. R., distant in a northerly direction by wagon road eight miles, and consisting of nine full claims of 1500x600 feet each; all heavy veins from 2 to 10 feet wide, one 30 feet. One of which is patented; balance possessory title perfect, with sufficient development done upon six of the unpatented claims to entitle owners to patent. But one of the group has been operated by the present owners; this one (the Last Chance) is now being developed and the ore mills from $2.50 to $102.50 per ton, free gold, and has from the start to present time yielded a net profit of 30 per cent over total running expense. CAUSE FOR SELLING—The company has no capital, therefore the property is too large for us to handle satisfactorily. Would sell a part or all; would prefer to sell an undivided one-half. Price $18,000 cash; or for the whole, price $40,000 cash; or would give a working bond, price $60,000, 30 per cent cash. Also three other distinct groups, all situated within the same belt and county, one of which consists of six full claims 1500 by 600 feet, patent applied for; another of four full claims, one patented, and still another of three claims, unpatented, all large, heavy veins. Included in the last named three groups are four mines that were worked quite extensively 25 to 40 years ago and have an A1 record: one yielded an average of over $40, another over $30, and two more over $20 per ton free gold. Will sell one mine, one group or two groups. Will give purchaser pick and choice. This is an unprecedented opportunity for mining men of capital to secure a valuable property at a reasonably small figure. Come and look at it. No triflers or middlemen without positive backing need apply. For further particulars, please address **S. B. FOWLER, Maybert, Nevada County, California.**

Gentlemen:

We desire to express to you our appreciation of the 12 H. P. Power Gasoline Hoist, purchased by us for our works at Silver City, Utah. The same is working satisfactorily to our Board of Directors. We have never yet used in any one day, five gallons of gasoline [illegible] to do our hoisting, although we are running two shifts of men, one at night and one in the day, using the engine during the day only. We are satisfied that in a dry country, or in one where fuel must be transported any considerable distance, that the gasoline hoist is the proper one to purchase; for that matter, we may say, even where water and fuel is plenty, after a thorough test of the Hercules Gasoline Engine, we would not consent to the erection of any other plant, as it costs less than three-fourths of a cent per ton hoisting one hundred and sixty-five feet high. We therefore take pleasure in recommending the Hercules Gasoline Engine as being the most complete and successful hoisting engine of that kind in the market.

Very respectfully,

For Aces Mining Company,

By Franklin Booth President.

Fac simile of letter to

By J. R. Slater Secretary.

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One 40 H. P. Tubular Boiler.

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DENVER, COLORADO, U. S. A.

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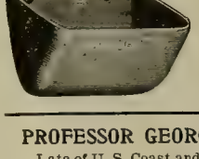

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Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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A LIMITED NUMBER of the shares of the treasury stock will be sold for the purpose of development at the price of Ten Cents per share. The par value is One Dollar, and under the laws of Colorado are absolutely non-assessable.

For prospectus and full particulars call or address **E. B. MYERS, Secretary,** Room 30, 139 Post Street, San Francisco.

12

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Three	"	"	" NewYork.
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One	"	"	" Boston.
Two	"	Copper Properties.	
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The Kinkead Quartz Mill will do the work of five stamps with less than half the power, and can be built and put into operation for less than half the cost of stamps. The only wear is the shoe and die, which is less than that of one stamp. The cheapness in first cost and operation of this mill makes it possible to work with profit ores so low in value that they have heretofore been treated as waste. Each mill will crush 10 tons in 24 hours through a 40-mesh screen.

It requires only a 2-horse power Daniel Best Crude Oil Engine, to operate this Mill and one concentrator. Engine and Mill can be set up and running in 48 hours.

Price of Mill $1,000, f. o. b. San Francisco, including Self-Feeder, Ore Hopper, Frame and Foundation Timbers all framed, and one Silver Copper Plate. Weight, 2½ tons; heaviest piece, 1350 pounds.

One ordinary mortar for a 5-stamp battery will weigh more than our whole Mill. This Mill can be made in 300 lb. sections, if desired, at extra cost. Send for Catalogue.

Interior of Four Kinkead Quartz Mill Plant at Virginia City, Nevada, Equal to Twenty Stamps, Crushing Fifty Tons Quartz Daily Average.

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JIG CONCENTRATOR
For working the sands from the separating box.

SLIME CONCENTRATOR,
Works the slimes from the separator.

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Concentrates ores where there is a lack of water.

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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1882.—VOLUME LXXIII. Number 5. SAN FRANCISCO, SATURDAY, AUGUST 1, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

The Springer Concentrator.

Herewith is presented a cut of the Springer concentrator. The inventor and manufacturers claim for it: "Perfect distribution of the pulp over the belt by means of a readily controlled hopper and drip pans. An end rocking motion which can be adjusted to the best settling qualities of the pulp and the quantity of water. Adjustment in the grade of the belt while running at full speed. A soft flooding wash of concentrates before entering the receiving tank. A sure and certain cleaning of the belt of concentrates in the receiving tank. A belt to which will adhere all concentrates and slimes. Adjustable eccentrics, so that the shaking stroke can be adjusted, as well as a machine that requires little attention in operation, with small wear." They say this concentrator "embodies all these features to a perfected degree, and requires so little attention that one man can easily attend to a dozen."

The belt is made of No. 3 canvas, woven specially, with solid rubber flanges. There is a steady uphill travel of the belt on the rolls over the head roll or drum and below the surface water of receiving tank. Its weight is 2000 pounds and it occupies a space of 9x12 feet. The canvas belt is a special feature of the Springer concentrator.

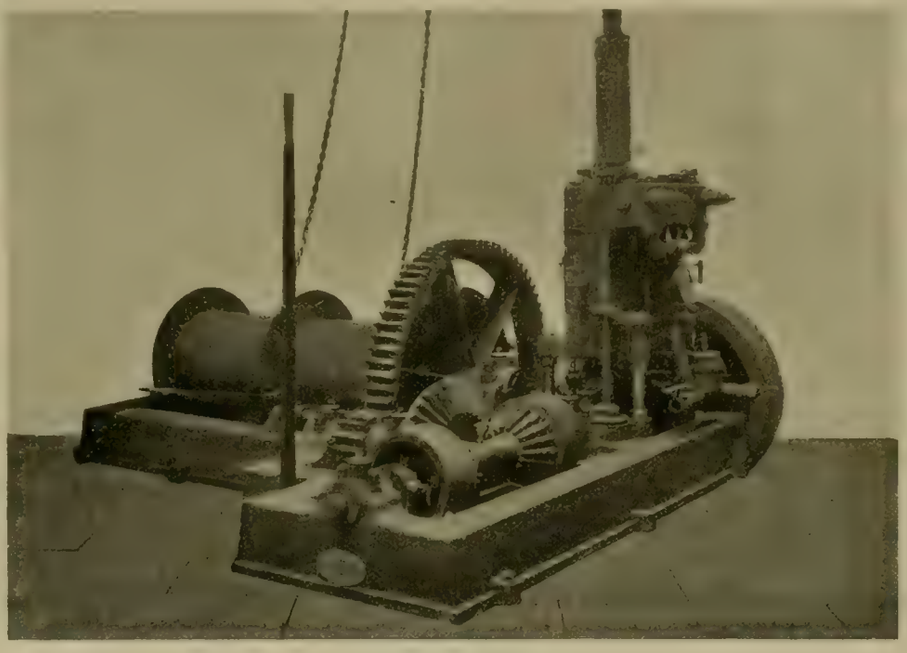
The heavier particles of quartz and fine slimes are precipitated on the rough surface of the belt and carried upwards over the end roll to the wash tank. The continual motion of the belt table, surging beneath the water in the receiving tank, washes the belt clean of all concentrates, which are precipitated in the receiving tank. The concentrator is designed to daily handle 12 to 15 tons of pulp. It can be seen in working operation at the warehouse of I. S. Van Winkle & Co., 413–15 Market St., San Francisco.

THE SPRINGER CONCENTRATOR.

THE Virtue mine, Baker Co., Oregon, last week let a $20,000 contract for 5000 cords of word. This is illustrative of the good a mine is to a community. That twenty thousand dollars will be a Godsend to many a one in that vicinity during days of depression. Wool cannot be sold at Baker City now for seven cents per pound; wheat hardly pays for hauling; all eastern Oregon's products are alike depressed, but fine gold brings $20.67 per ounce and gives employment, direct and indirect, to many who would otherwise be well-nigh destitute.

New Mine Hoist.

The Rosalie Mining Co., whose office is at San Francisco and whose mine is at Arispo, State of Sonora, Mexico, have recently installed in their mine one of the Union gasoline engine hoisting plants, a cut of which is illustrated herewith. This mine is of gold quartz and is reported to be very rich, assaying well up in the hundreds.



GASOLINE MINE HOIST.

The officers of the company are: President, ex-Governor Daggett, of San Francisco; Vice-President, Chas. Yale; Secretary, Hugh Tevis. Directors—John Reid, James McNab, Robert Barnett and C. F. Beverage.

The hoisting plant shown was built by the Union Gas Engine Co. of San Francisco, and, it is stated, is capable of raising one ton of ore at a speed of 125 ft. per minute. It is self-contained, and so arranged that one car of ore is raised and at the same time the empty car is lowered. With one vertical lever the drum is revolved in either direction, or by placing the same lever in vertical position, and, by pressing down foot lever, load can be stopped at any point and safely held.

This form of motive power is rapidly coming to the front for mining purposes, owing to the compact form of the fuel. Three other hoists of this pattern have been ordered and are now in process of construction.

A GOOD word is to be said for the leasing system, which has proved so mutually satisfactory in Colorado and elsewhere. Much of the mining there in the last three years has been done by leasers. The leaser has to be a miner; he can't be simply an ordinary laborer who imagines he must have a miner's wages because he works around a mine. He is jointly interested with the mine owner, and the relationship is of mutual benefit. It gives him an interest in local and general welfare, inculcating thrift and industry, coupled with independence.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....General Manager

San Francisco, August 1, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Gasoline Mine Hoist; The Springer Concentrator, 85. Julian Sonntag, 88.

EDITORIAL.—The Springer Concentrator; New Mine Hoist; The Leasing System in Colorado, 85. Better Transportation; A Mistaken Policy; Necessity of a Cabinet Officer as Secretary of Mines, 86.

SCIENTIFIC PROGRESS.—The Aerial Torpedo; A Large Portion of Land Unexplored; Light, Heat and Electricity Interchangeable; Ozone an Important Industrial Agent; To Grasp Nature's Mysteries, 89.

ELECTRICAL PROGRESS.—An Electric Heater; The First Electric Locomotive of Any Considerable Size; The New Highway Bridge Across the Connecticut River, 89.

MECHANICAL PROGRESS.—Benefits from Motor Cars; Relative Resistance of the Hardest Steel and Hardest Stone; Chicago to Have the Highest Tower in the World, 89. Charges of Powder in Guns; A Great Plant at Nijni, Russia; Mechanical Power in Paris, 90.

PRACTICAL INFORMATION.—Measuring Candle Power; Advantages of Paper Tiles; A Street Railway with Gas; Loss of Weight in Coal from Exposure to Weather; Sensitive Variety of Plants; Onyx a Substitute for Lithographic Stone, 90.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 94-95.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 102.

MISCELLANEOUS.—Concentrates, 87. The "Inventive" Faculty; New Guinea a Gold Field; A Representative Californian; New Theories Wanted; A Grievance of the Engineering Profession, 88. Commercial Paragraphs; Obituary; California Mines and Miners, 90. Coast Industrial Notes: Patents; Fourth on the List; Personal; Recent California Mining Incorporations; Recently Declared Mining Dividends, 96.

A Mistaken Policy.

It is not uncommon to receive an item of news from an authentic source saying "the —— mine in —— district, —— county, has been sold to San Francisco people" (or New York or London men). When it is suggested that the value in a news sense of the information would be greatly enhanced by stating the names of the purchasers, and the amount paid for the property, it is generally said: "I'll tell you, confidentially, but the names or amount must not be published." When asked, "Why?" almost invariably the answer is, "Well, they don't want it known." Of course, the confidence is not abused, but the bare, bald statement that "the Copper Gong mine in Bluestone district, Pipeclay Co., has been sold to New York parties, who will develop the property," is of far less value and authenticity than were the paper at liberty to chronicle the sale of the mine "to Brown, Jones & Co., of 38,633 West 343rd street, New York City, for $75,000, $25,000 down, and the balance in one and two years." The first statement is on a par with that class of mining items that says "Johnny Hayes has refused $20,000 for the Holy Terror." The second would carry weight and belief in its correctness. Just why we of California are so shy or reticent of giving names, figures and details in these matters is sometimes a puzzle. In almost any other mining section when a sale is made, be it big or little, the general impulse is to give it the utmost publicity. Here with us the desire has all along been the other way; the general tendency is to keep it as quiet as possible. One can readily understand a desire to have any and every preliminary kept out of print; when a mine is for sale, or being reported on, or negotiations for its sale are in progress, up to the time the whole thing is settled and the money paid and the new owners in legal possession there may be many valid reasons for having nothing said about the transaction. But when the whole thing is settled, and there is no longer the slightest apparent need or reason for concealment, the principals are still desirous to have nothing published concerning exact facts, the result cannot be wholly satisfactory.

The reason may probably be a lack of confidence, a sort of distrust. There are those who would, if they could, upset a trade at any stage of its progress, men who know a whole lot that generally isn't so. Then, too, there is the natural, almost instinctive, desire of a man to keep his business to himself. The benefit, however, is in the case cited of too manifest a nature to justify the usual reserve. Nothing helps a district so much as authentic news and exact published information regarding a bona fide mining transaction, where money changes hands. Nothing is of more tangible value to the adjacent property, and, in one sense, to the property itself. We are not unmindful of any of the possible circumstances. It is thoroughly understood that in a case where a man bonds a mine for $20,000 and sells it for $30,000 he is not particularly desirous of widely proclaiming the fact. The effect of such knowledge on the bondee or the final purchaser might not be satisfactory to any one of the three. All this and kindred possibilities are borne in mind in discussing the matter. But in general it is evident that an accurate statement of the main facts in the purchase and sale of a mining property would be of more benefit, individually and collectively, than the time-honored policy of keeping out of the published account the money consideration.

Time was when a man who bought a mine didn't care to have the fact known lest it might injure his business standing. That time is gone by. The soundest, wisest, most conservative business men of the world are now among the principal purchasers of mining property in this State and elsewhere. It is no longer a discredit to a man to know that he has an interest in a mining property, rather a tribute to his sagacity, an evidence that he knows a good thing when he sees it.

This is not intended as a plea for information. If this paper wanted to it could publish the exact details in nearly every instance. The idea is to note the almost universal policy of repression in this regard. It is not good policy, viewed from any standpoint. It would be better in any conceivable case that the full facts were published, better for the seller, better for the buyer, better for the district, better for the county, better for the State.

Better Transportation.

Increased activity in the mines of California brings increased facilities in everything but transportation. Outside the present lines of railway, travel is about as difficult in many sections as ten or twenty years ago. The fullest measure of success and satisfactory development cannot be attained till improved means of transportation are in general use. Men complain that it takes days to make a trip that should be made in as many hours at less expense and infinitely less inconvenience, and that ordinarily profitable ore cannot be economically handled. Mining properties that under better conditions would pay well and give employment to a large number of men lie dormant. The working of ore at a profit often depends on the one question of cheap transportation.

In this, as in nearly all other things, the matter is purely a commercial one. If it will appear to be a paying project, light lines of railway can be built anywhere and everywhere there is a possibility of profit. Whether there is sufficient promise of profit is for advocates and projectors of such proposed lines to determine. Take, for instance, the forty miles from Oakdale, Stanislaus Co., to Sonora, Tuolumne Co. The latter county is one of those experiencing renewed activity which it is claimed could be greatly increased and permanently maintained by the construction of the line indicated. The narrow-gauge road from Colfax to Grass Valley and Nevada City is a good illustration of the benefit in every way such system of transportation may be to a thrifty mining region. Probably next to the mines themselves nothing has been a greater factor in Nevada county's prosperity than that little road. Supt. Kidder supplies figures that show the enterprise is a fairly paying one.

Colorado furnishes a good example of the great benefits resulting to a State from improved means of transportation to and from the mining sections. That State is gridironed with light railways. The following shows how this matter is looked at in Colorado. The Boulder Co. *Herald* of April 3, 1896, says:

An important project is on foot for this section which will mean much for Boulder and the mountains of this section. It will be known as the Inter-Mountain Railway. The building of this road as outlined by the promoters means much for Boulder city and the county. It will be the starting of prosperous times for this city and county. The construction of this road will make this city the milling center of the mining camps within thirty or forty miles. It is a well-known fact that small mills seldom pay and no one process will handle the ores of this county. The many idle mills in the county will verify this statement. Large mills with combination processes seem to be the only solution to this problem of how to handle our ores at a profit. The building of this railway makes the large milling plants feasible. It is promised the road will tap every mining camp in Boulder county, and a very low rate on milling ores will be given on shipments to this city; 50 cents per ton from the nearer camps and not to exceed $1 from the outside camps. With these rates in force it is estimated the shipments will exceed 500 tons per day when milling facilities are had. We have it on good authority that several responsible parties are ready to build mills on the commencement of work on the railway. The building of this road and mills in the city will also relieve the city of the necessity of stopping by law the building of any more mills on Boulder creek or its tributaries above the head of the city's water supply. Dumping tailings into the creek must be stopped or the water supply of the city is ruined. Our prosperity depends on our mines and mills. To shut off the mills means hard times; to allow them to destroy the water supply means ruin to the city. Happily the railway will solve the problem to the best advantage of all. Owners of mills now in operation can well afford to move their mills to this city. The saving in the cost of fuel alone will soon pay for cost of moving. Another advantage in being located at a central point is that the mills would not be depending on one mine or camp for ore. This would insure the steady running of the mills. The immediate benefit to this city derived from the building of this road will be the employment of all who are able and willing to work, not only on the railway work, but in other directions that will follow the building of the road.

The following is an estimate of receipts and profits on forty miles of the Inter-Mountain Railway between Boulder and Ward, and Boulder and Lafayette.

150 tons milling ore, Ward and intermediate camps to Boulder	$ 100 00
Smelting ore and concentrates, Ward and intermediate camps to Boulder	50 00
Logs, lumber and timber, Ward and intermediate camps to Boulder	60 00
Passengers, Ward and intermediate camps to Boulder	30 00
Merchandise, etc., Boulder to mining camps	40 00
Coal, Lafayette to mining camps	50 00
Coal, Lafayette to Boulder	30 00
Other freight, Lafayette to Boulder	25 00
Passengers between Lafayette and Boulder	30 00
Mail and express	20 00
Paving and building stone	20 00
Total per day	$ 455 00
Per month, 30 days	13,650 00
Per year	163,800 00
Operating expense, 60 per cent of receipts	$98,280 00
Interest on bonds, $240,000 at six	14,400 00
	$112,680 00
Net profit	$ 51,120 00

The above is cited as being analogous to the forty miles between Oakdale and Sonora, in this State. It is thought that $7500 a mile would build and equip such a road. Following is an estimate of the cost of construction and equipment of the two-foot gauge railroad in Boulder county, Colorado, forty-nine miles long:

Organization expenses	$ 1,000
Grading, masonry, trestling and bridging	50,000
Ties, 112,000, at 15 cents	16,800
Rails, 1920 tons, at $32 per ton delivered	61,440
Splices and bolts	3,200
Spikes	2,600
Laying track	6,000
Surfacing, etc	6,000
Frogs and switches	2,000
Water and fuel stations	1,000
Depots and buildings, not to exceed	5,000
Engineering	6,000
Incidental and minor expenses, 10% of labor items	7,500
Total for roadway	$168,540
EQUIPMENT.	
Four locomotives	$ 16,000
One hundred freight cars, at an average of $225	22,500
Two baggage cars	1,250
Two combination cars	1,500
Four coaches	5,000
Miscellaneous cars—hand, push, etc	1,000
Telegraph line	3,200
Total for equipment	50,450
Grand total	$218,990

The above does not provide for an elaborate road, but it would doubtless answer all requirements. In the building of such roads as the one suggested lies largely the problem of successfully working many of the mining sections in this State, now too remote for practical consideration.

THE suggested necessity of a Cabinet officer as Secretary of Mines, recently made herein, bears abundant fruit. Nearly every mining paper in the country indorses the idea, and many personal letters received at this office give abundant reason why action on the matter should be unanimously in the affirmative.

Concentrates.

A CUBIC YARD of coal weighs, practically, one ton.

THE Salt Lake, Utah, mining exchange has resumed operations.

THE *Kootenaian* says the mining stock market in that part of British Columbia is flat. Another bad case of boom.

AUSTRIAN capitalists have representatives inspecting Sierra and Plumas county mines.

THE De Lamar, Idaho, Mining Co. paid a 20 per cent dividend for the year ending June 30, '97.

THE next convention of the California Miners' Association will be held in this city next November.

ABOUT 1000 men are in the Florence, Idaho, district, and considerable development work is being done.

THE Calumet & Hecla mine paid a $500,000 dividend on the 22nd ult., making a total to date of $45,850,000.

A FLAT of all the underground workings up to date is always a good thing for every working mine to have.

THE Morning Star Mining Company, Iowa Hill, Placer Co., last Tuesday declared dividend No. 68 of $5 per share.

AMONG the nations Mexico is the present largest silver producer. The '95 output approximated 51,000,000 fine ounces.

J. C. FRANKS, U. S. Marshal, Alameda, has bonded the Alpine mine, seven miles from San Andreas, Cal., for $25,000.

"CAPITAL and water are mainly needed at Randsburg, Kern Co." The remark is applicable to several other localities.

ACCORDING to the *Miner*, placer miners are busy now on all the streams and gulches of Yavapai county, Arizona, washing out gold.

A PALL of smoke is hanging over the States of Oregon, Washington and Idaho, and much valuable timber has been destroyed.

NEVADA and Montana miners are contributing toward the silver political campaign. At Belt, Montana, a coal mining town, every man gave $5.

THE Mexican dollar has 417.79 gross grains, or 377.17 grains of pure silver. The United States silver dollar has 412½ gross grains, or 371.25 pure grains.

THE public treasury reserve is again reported running low. The private treasury reserve is also somewhat depleted in a good many individual cases.

THE Northwest Mining Association, by its executive committee, will make a mineral exhibit at the Northwestern Exposition at Minneapolis and St. Paul next month.

THE new owners of the Oro Fino mine, near Trinity Center, Trinity Co., are credited with immediate intention to build a 40-stamp mill. The purchase price is said to be $150,000.

THERE are 200 miners at work at the DeLamar mine, Nevada. The daily output is 200 tons. The bullion coach, with four armed guards, makes weekly trips to the railroad terminus.

NEW YORK men propose, if the report warrants, to put in an extensive hydraulic plant at Gold Creek, Elko Co., Nevada, where they have an option on several thousand acres of placer ground.

THE fact that in Michigan they freeze a formation to sink through it and in Alaska they thaw the ground to sink thereon illustrates some of the opposite expedients in practical mining.

THE *Tidings* says that the aggregate motive power at the Allison Ranch, Nevada Co., mine, after the water, electric and steam machinery shall have been put in, will amount to 950 H. P.

INCREASED activity in California mining counties causes a corresponding increase in the assessment rolls, and in one more way indirectly contributes to the prosperity of the entire State.

THE *Union-Democrat* at Sonora, Tuolumne Co., has in its forty-three years seen nearly $100,000,000 gold taken out of that county. It will doubtless see as much more added to the world's wealth.

THE first shipment of crude oil ever unloaded on the Comstock, Nevada, was a carload last Saturday consigned to the G. & S. M. Co., to be manufactured into gasoline for the Silver City mill.

CHICAGO officials are arresting and prosecuting some of the bogus mine "operators" and "promoters" who have been inducing purchase of valueless stock in fictitious companies. 'Twas about time.

JAS. DUFF of this city is the superintendent of the new mining company organized in this city to operate in Corea. The company is securing men at good prices, who take their departure from Tacoma, Wash.

SEC'Y OF THE INTERIOR SMITH has approved two more California land grants to the S. P. R'y Co.—list number 24 and supplemental list thereto in the Stockton, Independence, Los Angeles and Visalia districts.

THE midsummer dullness affects all classes of business, except that connected with gold mining. Makers of mining machinery report that not in years were they so busy as at present, many with orders far ahead.

"IF silver should go to one dollar an ounce" is the hopeful sentence with which innumerable items now begin in the columns of papers published in places once busy with life, now as cold and silent as the ore it no longer pays to work.

THE big irrigation dam across the Mokelumne river broke last Sunday, doing immense damage. It was doubtless an act of Providence. If two gallons of water spills out of a debris dam, it is caused by pure cussedness on the part of the miner.

THE June gold output of the Witwatersrand, South Africa, district was 193,640 ounces, a decrease of 1,368 ounces as compared with the May total and of 7,301 ounces as compared with June, '95. The decrease is locally attributed to the scarcity of coal.

NEWSPAPERS that till recently never admitted the existence of such a thing as a mine now give columns of cullings and comment on mines and mining matters, which exemplifies the popular demand for news regarding the most paying of any present productive industry.

IT is probable that when the present extreme heat has passed in that section the borders of Kern and San Bernardino Cos. will be alive with men attracted by the report of new gold finds. A new ledge is now reported discovered five miles south of the first prospect, in San Bernardino county.

OUR contemporaries who are advertising the more or less wonderful statements of the Hartzfeldt Reduction Co., to the extent in some instances of half a page, should make some inquiry as to the authenticity of what is claimed therein. 'Tis a duty they owe to their subscribers.

THE Ute and Ulay mine at Lake City, Colorado, has been closed down by the order of F. S. Underwood, assignee of the Mines Leasing Company. The mine has been giving employment to 250 men and paying $30,000 per month in wages. The *Investor* says no cause is given out for the stoppage of work.

CALIFORNIA next November elects nine men to cast the electoral vote of the State in the real "presidential election" in January, '97. There will certainly be 27, probably 36, names on the ballots voted in this State next November. The nine receiving the most votes will represent California in the electoral college.

ABOUT 30 miles southwest of Port Arthur, Ontario, are what is said to be the only silver mines on the continent, under British dominion, that have produced silver in considerable quantities. Brill and Blum, two French mining engineers, are now examining them with a view to their purchase and resumption by French capital.

VANDERBILT, San Bernardino Co., is reported to be reviving. A. G. Campbell has ordered machinery to the extent of $60,000. The Boomerang, which is now down nearly 600 feet, will be run down 500 feet farther, which will, it is thought, uncover ore and develop water to assist in working it. The 10 stamps now working will shortly be doubled in number.

THE *Mining Investor* says that a mining engineer just from Cripple Creek was asked by another concerning the situation at the camp. "Oh, they are doing the same as usual," was the reply; "the tenderfeet are taking the ore out, where they find it, and the mining men are hunting for it where it ought to be," which is hardly fair to the "mining men."

LOCAL geologists in Plumas county advance the plausible theory that before the upheaval of the Sierra Nevadas a river was running through the United States from north to south down into Mexico, and even South America, and that the rich diggings on the American, Feather and Yuba rivers resulted from the cutting of these rivers into the ancient river bed that they cross.

RETURNING miners from Alaska say a good many hard things of that section. In the early part of the year nothing too good could be said by some of the same people. The truth lies between. Alaska didn't deserve the glowing eulogies it received, nor does it deserve the present condemnation. There is gold there, but it is not an ideal El Dorado; it is not California by a large majority.

THE Populist national nominating convention at St. Louis sat down on Senator Stewart of Nevada and incorporated a plank declaring for the miners in the effort to prevent wholesale absorption of the mineral area. Though they are "away sale absorption of the mineral area. This first public recognition of the kind in the history of national nominating conventions is worthy of passing note.

UNUSUAL cloudbursts are reported from the high Sierras in this State, from Nevada, Utah and Colorado. In addition to the usual destruction occasioned by the rushing water, there is a source of loss in the latter State by railroad washouts which involve temporary suspension of work in several mining towns. Ore shipments are interfered with, and in some cases the supplies of provisions, etc., are cut off.

J. LONGABAUGH of Carson, Nev., is a man whom "slickens" have made rich. Years ago he got a U. S. patent for some land near Bellville, Nev., but it wasn't worth paying taxes on. Since then thousands of tons of tailings have spread over it, and, an improved process of working them making them profitable, Mr. Longabaugh will get more for his land than had it proved ordinarily rich below the surface.

ON the Comstock, Nevada, has recently been milled ore from the 3250-foot level, now under water. At present no work is being done at a greater depth than the 1700-foot level, where the Sutro tunnel tapped the lode. It is not an unusual route for travelers from Virginia City to points more easily reached that way to go down by vertical shaft to a distance of 1700 feet, thence five miles through the tunnel.

A TWO-COLUMN ARTICLE containing a condensation of alleged facts concerning the production of gold and silver recently appeared in the leading paper of the middle Mississippi valley. Seldom has been published anything of the kind containing so many errors. It is three years behind the times and is full of mistakes. It is being widely copied all over the country and disseminates a more than ordinary amount of misinformation.

AT the meeting of the U. S. Debris Commission last Monday, permits for hydraulic mining were granted to the owners of the Ellen Taylor mine, near Indian Diggings, El Dorado Co., and the Merlow mine, near Sonora, Tuolumne Co. Permits to construct dams for impounding debris were granted to the owners of the Cook gravel mine, near Jamestown, Tuolumne Co., and to the Omega mine, near Washington, Nevada county.

CONSIDERABLE local interest is manifested in the drilling now going on in the lower levels of the Mercur, Utah, mine, with the expectation of striking telluride ore. It is believed there that before the proposed depth of 1560 feet has been attained native tellurium and telluride will be found. Native tellurium is of very rare occurrence. It is found chiefly in Transylvania and has been reported at various places in this State and Colorado.

ACCORDING to a local paper Nevada City has a beer mine, The man at the windlass said: "You see, we've been engaged to clean out this old shaft to be used as a well by the landlord yonder. As we dig down we strike bottles of beer—that is, our partner finds them. He has only let us see a half dozen of them so far, but if the supply don't run out soon he will be in condition to turn his job over to us, and be hauled to the top in a bucket." For years the hotel man used the shaft to keep his beer cool in.

THE powder output of the California companies for last July was nearly three times what it was in July, '93. About 90 per cent of dynamite used by the mining companies on this coast is known as No. 2, or 40 per cent nitro-glycerine. This now sells at 8 cents per pound, net cost, which is a big reduction. The companies say they can hardly supply the demand, that there is no money in the business, and they don't care for new customers. The powder costs the individual California miner 10 cents a pound The same powder costs the Australian miner 37½ cents per pound.

THE rock drilling contest at the State Fair next month will be in charge of three judges. Six prizes will be awarded, one a purse of $400, $250 to winning team, $100 to second, $50 to third in a double-hand contest on a down hole in Folsom granite. A second purse of $400, $200 to winning team, $100 to second, $50 to third, will be given for a double-handed contest on a one-half upper-hole at an angle of about forty-five degrees. The rules and regulations were published herein last Saturday. All entries close Sept. 1st. Letters postmarked that date will be received. An entrance fee of $5 for each man will be required. The contests begin Sept. 7th, at the Pavilion, Sacramento. No one anywhere is barred.

ON July 1st the amount of silver dollars in the Treasury available for the redemption of Treasury notes had become reduced to $10,659,582, and was further reduced by redemption during the month. The coinage of silver dollars by the mints will be increased from 1,500,000 to 3,000,000 per month from today. From the first of March, 1893, the Treasury has held 29,390,461 standard silver dollars for the redemption of Treasury notes issued under the act of July 14, 1890. Since the first of March, 1893, the coinage of silver dollars has aggregated $11,983,056. Of this sum, $2,311,677 was profits on seigniorage, leaving $9,671,379 for the redemption of Treasury notes. The amount of Treasury notes redeemed in silver dollars and canceled from November 1, 1893, to July 14, 1896, was $28,402,258.

A MONTANA subscriber pays us the unique compliment of asking that the advertisements in this paper be so arranged that a page of advertisements shall be printed on the obverse side of a page of "reading matter." The reason for the unusual request is that he "wants so often to cut out something good," and finds after he has cut it out that there is something equally good on the other side that he cut in securing the first item. Probably the better way to do would be to follow the example of so many thousands of our subscribers who weekly file the paper for reference. As to the advertisements, rightly considered they are of at least equal value to the reader. There is no news in the paper of superior interest to the announcements of the men who make and furnish the latest and best in all that mining men require.

MADDENED by exposure fraudulent mine schemers are threatening British Columbia mining papers with libel suits. That is something any straight mining paper must always expect. It is the duty of a mining journal to expose fraudulent mining schemes, and it is natural for those whose plans are upset to vehemently protest. Wherever and whenever there is any activity in legitimate mining there will be found men trying to take unfair advantage; 'tis so in politics and all forms of business. The British Columbia papers have nothing to fear so long as they confine themselves to the facts. They will earn deserved public confidence and have what is dearer to any reputable journal than money—good character. Such a paper as the Rossland *Miner*, for instance, is of more value to the district in which it is published than can be accurately estimated.

THE Supreme Court of California this week handed down a decision, in which the judgment of the lower court was reversed. It was the case of W. S. Howeth, plaintiff, J. C. Sullenger, et al., appellants, in an action to determine rights of parties to mining claim. Section 2324, U. S. Revised Statutes, provides that "the location must be distinctly marked on the ground, so that its boundaries can be readily traced," but does not prescribe how it shall be marked. The matter is left to the regulation of the local laws. Held—"Any marking on the ground claimed by stakes and mounds and written notices, whereby the boundaries of the claim located can be readily traced, is sufficient." When the ultimate fact is found, no finding of probative facts which may tend to establish that the ultimate fact was found against the evidence, can overcome the principal finding.

R. W. WOODBURY, president of the California Eastern Railway, located to run from Los Angeles through southeastern Nevada to Utah, which has thirty miles built, thinks that the mineral resources alone justify the rapid extension of the road eastward. The difficulty has been to prove the existence of the ore in paying quantities, and to do this he has organized a company which will build traction wagons, to be operated by steam and run on the surface of the ground. These are now being built. With what can be carried on the wagons themselves and on trailers, he expects to haul fifty tons at a trip. This is only an experiment which has not yet been proved. His theory is that when it is found that the ore can be transported reasonably the mines will be worked, and if the mines are once put in operation in the country he can show that there is enough ore in the country to justify the erection of a railroad.

BY a two to one vote the miners of Lump Gulch, Montana, have decided that they do not wish to be longer compelled to board at the company boarding houses, and have served notice on the mine owners that on and after August 1st they intend to board where they see fit. They feel that it is unjust to compel a married man to board at the company boarding houses, where it costs on the average about 33 cents a day to feed him, and then charge him $1 for it. It has the effect of compelling a man to keep up two establishments, and after he has paid his bills at the end of the month he has not much left to show for his labor. On the other hand, where a man is straining every nerve to develop a property, and putting every cent he can rake and scrape into it, and giving employment in the meantime to all the men he can employ at the going rate of wages, he should be helped and encouraged in every way possible.

THE specific weight of magnesium is about two-thirds that of aluminum, viz., 109 pounds per cubic foot. It melts at 811° Fahr., and has electrical conductivity equal to 41.2 per cent of that of pure copper. Its tenacity ranges from 23,000 pounds up to 32,000 pounds per square inch. Its elastic limit in the shape of wire is about 8770 pounds per square inch, and its elastic modulus about 1,945,000 pounds, or less than that of most stones. The cast metal has a much lower tenacity, ranging from 9640 to 13,600 pounds per square inch. Alloyed with aluminum, up to 10 per cent of magnesium, it increases the strength and elastic modulus of the former metal, but greater additions yield a weak and brittle alloy. Professor Thurston states that, so far as he knows, all attempts made to form an alloy of copper and magnesium have completely failed, though much time and trouble were spent on the matter.

The "Inventive" Faculty.

'TO THE EDITOR:—The interest manifested in the attempts of the writer to suggest a rational answer to the question, "What is invention?" in the articles, "Is the Inventive Faculty a Myth?" *Engineering Magazine*, August, '95, and "Invention the Indefinable Requirement of the Patent Law," MINING AND SCIENTIFIC PRESS, May 4th–11th, '96, is apparent in the widespread reproduction in the Eastern papers and magazines, in those of Europe, Australia and faraway South Africa, and, further, in the still more numerous comments and criticisms thereon. This interest confirms the opinion, expressed in those articles, of the profound importance of a correct understanding of the subject. The legal aspect is but secondary to its bearing on education and general progress.

Hitherto the writer has refrained from replying to adverse criticisms, except in an indirect way in the second article, to such as appropriately fell within the scope of that discussion.

Many of the comments, though earnest, lacked point or pertinency; others, again, were anticipated and sufficiently answered by the articles themselves. The remainder, which, on account of the authoritative character of their source or other reason seem likely to cause misconception in the minds of those who have not carefully read the articles, should be answered. Earnest appreciation of the importance of the matter impels an endeavor to reply to all such criticism. This, for obvious seasons, is impracticable; but, fortunately, in the able editorial comment of *The Engineer*, London, England, May 29th, '96, and *The Engineering Magazine*, New York, July, '96, is embraced the general tenor and substance of this latter group. A reply, therefore, to these will sufficiently cover the ground. To the former an answer has been made in its own pages, which will appear in these columns at a later date.

It is to the remarks of the latter paper that attention would now be particularly called. The criticism of *The Engineering Magazine* opens with a discussion intended to answer the general import of the paper, "Invention the Indefinable Requirement of Patent Law." The separate propositions are then taken up seriatim. This same orderly sequence will be here followed.

The opening statement referring to the admittedly indefinable character of the word "invention" says: "This, however, does not prove that the word is not useful, or that its use is always or even generally misleading. For example, the two words 'animal' and 'vegetable' are in common use, and we could not dispense with them or some substitute for them; yet neither of these words is exactly defined, and there are cases of disagreement among experts as to the proper classification of some living things."

At the outset this shows a misconception. The suggested elimination of the word "invention" from the patent statute and practice was not based merely on its indefinableness, as the writer of the criticism would seem to have assumed, and against which erroneous assumption the introductory argument is almost wholly directed. The substance of the article in effect was, if "invention," as interpreted by the courts, patent office and text book writers, is a myth, difficulty and confusion must accrue in an ever increasing degree, as from the requirement of an impossibility in any other contract. The difficulty and confusion were clearly shown in the conflict of authorities with themselves, with common observation and common sense. Attention was called to the acknowledged impossibility of defining the word "invention" as further tending to show that the authoritative interpretation has no foundation in fact. It is, therefore, beside the issue to cite other words which, though indefinable, have an *unchallenged* foundation in existence. The illustrations of my critic are in no way parallel. The *existence* of "animals" and "vegetables" is obvious and unquestioned, whereas the existence of invention, on the contrary, *is* questioned. That these classes of animate things merge imperceptibly into each other is an interesting biological fact, but it has no bearing on the present matter. The same may be said of the words "life" and "death" and the many others referred to generally. A just and unanswerable criticism would show error in data employed, or conclusions reached, or facts proving the existence of "invention" as authoritatively interpreted.

The propositions which the present writer aimed to establish, taken up separately, are:

First—That though the third requirement (invention) has always been in the statute, and its meaning substantially the same as the present interpretation, until recently it has practically been a dead letter.

The accuracy of this statement is questioned thus: Examiners in the patent office, if competent, have always taken this point (of invention) into consideration, and have decided it one way or the other, as best they could, within the limitation of their knowledge and capacity for forming judgment. As this involves a question of fact, it can hardly be settled by argument. Patent solicitors, however, and those having dealings with the patent office, will without exception bear me out in the statement that until comparatively recent times a rejection for want of "invention" was practically unknown, and that now it is a common ground upon which applications for patents are now rejected. Readers will draw their own inference. The proposition simply states an obvious one. The point, however, is immaterial. The main issue is *not* if officials endeavor to carry out the law, but whether the statute demands an impossibility or not.

Second—That it is not by any means axiomatic that the third requirement is in any case possible of fulfillment; but, on the contrary, there are many cogent reasons for questioning whether "invention," like "spontaneous generation," is not a metaphysical myth.

This proposition, which in reality involves the essence of the whole contention, my critic leaves severely alone, barring the assertion that, notwithstanding the difficulty acknowledged to be experienced by authorities and experts, "an average man, by the exercise of common sense and judgment, would determine whether the subject of a patent is either in whole or in part the result of invention or not."

What it is pertinent to ask is the characteristic which would enable any one—judge, examiner or "average man"—to distinguish the work of the "inventor." A justice of the Supreme Court, after complete investigation, doubtless, of all the data, says it is an "impalpable something." The patent office examiners, who are experts in detecting its absence, notwithstanding reiterated invitations to enlighten us, are dumb as oysters as to what it is like which they do not find; and my critic, too, who says that any "average man" with common sense can see it, even he is tantalizingly silent as to what this "average man" will see. There are a host of attorneys, specialists in patent law, and others of capabilities high above the "average man," who would sacrifice much to share with the "average man" his perspicacity in this particular.

For more years than he cares to think of the writer has been a student of mechanics, engaged continuously in solving mechanical problems and designing machinery incorporating such solutions, many of which are covered by patents of the broadest scope. But as the result of thorough and painstaking investigation from the most practical standpoint—that of the expert witness—he is compelled to adopt the view that invention as interpreted by the courts, text book writers and patent office is a myth, and that there is no distinction characteristic of invention. The difference between the productions of individuals is only such as are attributable to varying degrees of knowledge, skill and reason.

My critic's "average man" would simply determine the question as judges do now, by his ignorance. If the device under consideration was complicated or outside of his usual experience, its production would involve "invention;" on the contrary, if simple or closely connected with his usual experience, then, of course, it is merely "the expected skill of the workman," and as such would not involve "invention."

Third—That even if it be in fact a real quality it has never been defined; nor is it of such character that its presence can in any case be determined beyond doubt. All authorities agree that "questions of invention proceed upon fine and subtle metaphysical distinctions."

This is admitted as true by *The Engineering Magazine*.

There is an astonishing lack of unanimity of opinion among magazine commentators and critics on the various propositions advanced by the writer in this discussion. Those admitted by some are scouted by others, and contrawise; and, again, all are approved by others. Men like the late Franklin L. Pope, but recently an honored collaborator of my present critic on *The Engineering Magazine*, and John Richards, than whom as an authority in his specialties there is none higher, and many others, also, whose opinions carry weight in the world of mechanics and invention, accept and endorse all propositions advanced by the writer in this connection; so that by a process of elimination or cancellation, pairing off each acceptance of a proposition with a rejection of the same, the writer's position would remain practically unassailed, strengthened by many able and authoritative supporters.

San Francisco, July 16, '96. W. H. SMYTH.

(To be Continued.)

NEW GUINEA is a gold field which is not unlikely in the future to attract much more attention than it has in the past notwithstanding the formidable obstacles which oppose successful gold mining there. There have been many expeditions into that country, but the dangers they have encountered have far outweighed their gains, and success, therefore, has rarely rewarded efforts of the gold seekers. But these various attempts were not attended solely with failure. They made the way easier for succeeding adventurers, until, at last, some small, yet promising, measure of success has resulted. Some time ago a party of Queensland prospectors reported that they had discovered payable gold on the Membare river, but at the time it was not generally credited. But now it has been confirmed by the arrival in Sydney of a member of the party, who asserts that in the headwaters of the river gold was discovered in large quantities.—Mining Journal.

A Representative Californian.

On this page appears a good portrait of Julian Sonntag, the secretary of the California Miners' Association. Mr. Sonntag has also just been unanimously elected as the president of the Manufacturers and Producers' Association. He is the general manager of the Giant Powder Co. and a representative California business man.

JULIAN SONNTAG.

New Theories Wanted.

As information is acquired concerning natural phenomena it becomes more and more evident that many of our most treasured theories and explanations will have to be thrown on the scrap heap of scientific hypotheses. The researches of Lord Raylegh in argon and helium have already demonstrated that there is much in the received molecular theory of gases that will have to be rejected as untrue. The Roentgen rays have done the same thing for light, and now Prof. Dewar has shown that as yet nothing like a satisfactory theory of electricity and magnetism has been framed. A recent discourse at the Royal Institution, London, delivered by Prof. Fleming, was mainly a statement of the very remarkable results obtained in the course of a series of experiments carried out by himself and Prof. Dewar on electrical conduction at low temperatures. It is not too much to say that these results go far to upset all our preconceived notions, and tempt us to ask if the phrase "conservation of energy" conveys any adequate idea whatever of any natural processes. Thus, for example, Profs. Dewar and Fleming seem to have established that a pure metal at absolute zero would have no electrical resistance, so that the smallest filament could carry the most enormous conceivable current without being heated. Some time since he stated that it was quite conceivable that a magnetic screen might be produced, and that if it was produced we should be within measurable distance of perpetual motion; in other words, of a machine which could work itself. Prof. Fleming stated that a pure metal at the absolute zero would form an absolutely opaque screen to electro-magnetic radiation. But the whole lecture bristled with statements going to show that there is no apparent connection between causes and effects, and that the expenditure or not of energy in the performance of process is brought about in ways of which we know nothing. For instance, it is impossible to send a current of electricity along a pure metal at normal temperatures without loss of energy. We have only to bring down the temperature to zero, and the loss of energy ceases. What is the connection between the heat in the wire cone and the expenditure of energy? As the years roll on science seems to drift closer and closer to the rocks of agnosticism; and the man who studies and experiments most will in the end be he who knows least.

A GREAT grievance of the engineering profession is that anyone, however inexperienced and incapable, can write after his name the letters C. E. or the symbol M. E. Similarly, anyone can describe himself as a metallurgist or a mining engineer without incurring any penalty. A recent writer has pointed out the absurdity and injustice of the fact that the lawyer who gets his fees whether he wins or loses his case, and the doctor who buries his mistakes under ground, are protected by a law which prevents unfair competition, while the engineering profession, holding, as it does, under its care millions of lives each day, is open to the irresponsible warfare of anyone who may choose to hang out a sign styling himself an engineer, whether he poisons a city with bad water or runs a sausage machine. The grievance is a real one for those who have devoted much time, labor and outlay in qualifying themselves for an arduous and honorable profession.

Scientific Progress.

The Aerial Torpedo.

The aerial torpedo is a small-sized gas-filled balloon, capable of sustaining indefinitely from 30 to 40 pounds at an elevation of from 500 to 1000 feet above the earth. Inside of the lower or small end of the balolon is placed a metal cylinder, which contains an electrical device, the purpose of which is to ignite the gas in the balloon at any stated period. Underneath the balloon is suspended a case or basket containing a high explosive similar to dynamite, which explodes with terrific force when striking a hard substance, like the earth or walled embankments. In action the management of the torpedo is described as very easy and simple, the inventor stating that a corporal's guard can with it accomplish what would require a large force to do by the usual methods now employed in the siege of cities, of the scattering of large bodies of troops. The torpedo complete is small and compact, and a large number can be carried by a few men and a pack animal.

The gas to inflate the balloon is carried in light or metal cylinders, enough being compressed in one cylinder to inflate a large number of aerial torpedoes. To use the aerial torpedo effectively all that is necessary is to approach as near as possible the locality where the torpedo is desired to take effect, and to ascertain the direction of the lowest air current and the velocity of same per hour. The length of time it would take for the air current to carry the torredo over the objective point can thus be ascertained, and the electric device set at the proper hour or minute. The balloon part is then inflated, the torpedo released, and the air current will convey the torpedo to the point desired. As soon as the time has expired as set in the electrical device and electric spark will ignite the gas in the balloon, causing it to explode, when the torpedo will drop to the earth. The explosive striking the earth or any hard substance will cause serious damage in that locality. In the siege of cities the aerial torpedo, the inventor believes will be especially effective, as no defense can be made against it, and it can be used in the night as well as by day, and by a few men of ordinary intelligence.

AT the present day the seas have been thoroughly explored except in the polar regions. An immense extent of the land, however, is entirely unknown; an even greater area has been only imperfectly explored; while only a comparatively small portion is so well known as to be covered with a network of triangles and completely mapped. After the Arctic and Antarctic regions, the part of the world least known to us is Africa, notwithstanding the explorations of this century. Next to Africa, Australia offers the greatest field to the explorer, even its coast not having been fully explored until 1843, while it has not yet been traversed from east to west, although once crossed from north to south. Except in the extreme northern and southern parts, the two Americas have been explored, but the whole central region of South America is practically unmapped. Of a total of about 20,000,000 square miles yet unexplored, Africa contains approximately 6,500,000; Australia, 2,000,000; America, 2,000,000; Asia, 200,000; Islands, 400,000; Arctic regions, 3,600,000; Antarctic regions, 5,300,000.

TO THE question, "If light originates in our atmosphere how is it that we see the sun?" Prof. Foster answers: Light, heat and electricity are interchangeable, the one always changing to the other two. The sun's magnetic forces come in contact with the carbon in the sun's atmosphere, and light results. These magnetic forces cross the dark spaces between sun and earth, no conflagration resulting and no light, because the carbon in space is not sufficiently dense. But on reaching the earth's atmosphere the magnetic radiations ignite the atoms of carbon and we have light in some unknown manner that possibly may yet be accounted for by the X rays' magnetic radiations that intervene through the dark, cold space between the sun and the earth. The X rays clearly demonstrate that shadows are caused by shutting of the magnetic rays, and this indirectly proves that light is caused by magnetism.

OZONE is becoming an important industrial agent. It artificially ages liquors, removes the effect of oily beans in coffee and improves tobacco. In its late application to the rapid seasoning of wood for sounding boards and musical instruments it increases the resistance of the wood to temperature and moisture, and adds to its acoustic qualities. It thickens linseed oil for linoleum in a few days, whereas the old method of oxidation often took several months. It bleaches linen in less than a third of the time required by sunlight. It is also valuable in chemical and technical processes, especially in purifying starch derivatives from undesirable color, odor and taste.

NO OTHER man is so overwhelmed with a sense of human weakness as he who strives to grasp Nature's mysteries. Hence it is that, while we boast the scientific triumphs of the last half century, and the world heaps honors upon the head of one of the greatest leaders in this progress, Lord Kelvin himself declares that his jubilee celebrates his failure. "I know no more," says he, "of electric and magnetic force, or of the relation between either electricity or ponderable matter, or of chemical affinity, than I knew and tried to teach my students of natural philosophy fifty years ago in my first session as professor."

Electrical Progress.

T. W. YOUNG of Washington has invented an electric heater to be lowered into an oil well. The idea is to generate electricity in large quantities, so that the refuse matter, which clogs the pores of the oil stone, will be melted and run out, causing a fresh upward flow of oil. The theory as to the exhaustion of so many wells is that the oil, in passing upward through the stone, has clogged the porous stone with paraffine in such quantities that the further flow is stopped and the well ceases to produce. Some think that it is because the supply in the earth has given out, but the generally accepted idea is that the oil is still abundant and only ceases to flow when the exit is stopped. It has been common to use torpedoes to shatter the stone at the bottom of the well, thus breaking up the clogged matter, but this is an expensive process. By the Young method, the machine, which is about three feet long, and resembles an iron cartridge, is placed at the bottom of the well and electricity produced of sufficient voltage to produce an enormous heat without melting the metal. "The current goes down the wires; and by the peculiar construction of the carbon-packed chambers, the intense heat is radiated into the rock in all directions, the paraffine and other refuse is softened and melted so that it runs, and when the well is started a fresh flow occurs just as strong as when it was first sunk."

THE first electric locomotive of any considerable size built in this country and what the General Electric Co. consider the first practical electrical locomotive in the world, with a rated draw-bar pull of 7000 pounds, has been purchased by the Manufacturers St. Ry. Co., of New Haven, Conn. It is equipped with air brake and is being prepared for shipment from the Schenectady works. Its total weight is thirty tons; it will be utilized to haul freight cars from the junction of the New York & New Haven railway one mile from the New Haven passenger depot, to the works of the manufacturing establishments located along that water front. The freight cars will be hauled directly into the yards of the manufacturers, and the loads will be collected by the electric locomotive and hauled to the main line of the N. Y. N. H. & H. R. R. where they will be taken up by the steam locomotive for transportation to their destination. The length of the line along which this locomotive will run is nearly two miles, the maximum grade against the load being about 2½ per cent. The guaranteed speed of this locomotive on this grade will be seven miles an hour with a heavy load behind it, but judging by its performance at the Lynn works of the General Electric Company it will probably be able to largely exceed the guarantee. The matter of electric traction on the steam roads since the successful operation of the elevated roads in Chicago, the branch lines of the N. Y. N. H. & H. R. R. and the B. & O. main line, with apparatus developed by the engineers at the Schenectady works, has elicited the interest of steam railroads all over the world.

THE new highway bridge across the Connecticut river connecting Middletown with Portland, Conn., is now swung by electricity. The electrical equipment consists of four G. E. 800 motors. Two of these are connected with the swinging mechanism, one working and the other being held in reserve. Of the other two, one is located under each end of the turning span, to raise it from the fixed piers before the third motor begins to swing it. The bridge span is 450 feet long—the longest single span highway bridge in the world. Previous to the installation of this electrical equipment fifteen men were required to start the bridge and eight men to swing it.

Appreciates a Good Thing.

ENRIQUE ALLCHURCH, INJENIERO.

Buenos Aires,
Las Heras 289.
June 15th, '96.

To the Editor of the
Mining and Scientific Press,
220 Market St., N. E. Corner Front,
San Francisco, U. S. A.

Sir:

In the hands of my old friend, Dr. Davison of the "Minas de Corrales," in the Uruguay Republic, I have lately seen your paper, about the most complete thing of its kind I have seen, and as an old mining engineer in these parts I am eager to possess it. I enclose draft No. 495 for eight dollars, U. S. coinage, which, if I understand aright, will pay two years' subscription.

Kindly acknowledge and send papers to the following address:

Senor Injeniero Enrique Allchurch,
Las Heras No. 289,
(Argentine Republic) Buenos Aires.

2nd of draft by next post; meantime believe me

Yours sincerely,

Enrique Allchurch

Mechanical Progress.

M. ARNOLD, inventor of the Arnold oil motor cars, speaking recently on the benefits that farmers would derive from the the motor cars, at a meeting of the Maidstone, England, Farmers' Club, stated that the motorcars would be of great service to the agriculturist but not if the bill before Parliament was allowed to pass in its present form. Farmers ought to be allowed to draw another vehicle behind. He was confident if a few alterations were made in the bill that the motor cars would do the work of light railways much more efficiently and thus save the country a lot of expense because they would run direct to the farmhouse, which railways could not do unless special sidings were constructed at an enormous expense on the farms. Motor cars could also carry loads to and from the fields, which would again be impossible with light railways. The expense to farmers would be considerably less, as four or five cwt. could be drawn a mile for one half-penny with the use of petroleum.

AN experiment was recently made in Vienna in order to test the relative resistance, under pressure, of the hardest steel and the hardest stone. Small cubes of corundum and of the finest steel were subjected to the test. The corundum broke under the weight of six tons, but the steel resisted up to 42 tons. The steel split up with a noise like the report of a gun, breaking into a powder, and sending sparks in every direction, which bored their way into the machine like shot.

CHICAGO is to have the highest tower in the world. The *Journal* says it will be 1150 feet in height, on a base 350 feet

square, and in comparison with it the Eiffel tower will be but a dwarf. It will be built by the City Tower Company, between Throop, Loomis, Harrison and Congress streets. It is said the tower can be built for a third less than the Eiffel tower, which cost $1,200,000. Thirty-five elevators will carry people to the different stages, where every sort of amusement will be provided, from continuous performances to pyrotechnic displays and air-ship flights by reckless inventors.

SINCE the Crimean war the charges of powder in guns, according to Sir Benjamin Baker, have increased from 16 pounds to 900 pounds; the weights of projectiles from 68 pounds to 1800 pounds, and the energies developed from 1100 foot-tons to 62,000 foot-tons. The British navy has been entirely rearmed since 1882, the Armstrong muzzle-loading wrought iron coil gun having been replaced by the breech-loading steel gun.

THREE Russian engineers have been in Philadelphia, and are now traveling west, who have made a contract for $500,000 worth of machinery. It is proposed to erect a great plant at Nijni, Russia, to build steam locomotives. Machinery will be bought in thirty different cities, reaching several million dollars in value. At present nearly all Russian Government railroad locomotives are built in Philadelphia.

THE Paris, France, Municipal Council thinks it desirable that not only should the tramcars be drawn by mechanical power, but that the omnibuses should also be replaced by horseless vehicles and is negotiating with the Omnibus Company to make the change. This is an official certificate of the highest character to the practical commercial success of motor carriages for ordinary road use.

Practical Information.

Measuring Candle Power.

People are desirous of a simple method of measuring the lighting power of a flame. The question how many candle power a lamp has can be settled without any great difficulty. The surest results are obtained by means of a grease spot. In its most simple application, the experiment can be tried easily at home. A sheet of white paper, with a grease spot in the center, is put into a frame and placed between two flames of different lighting power; for instance, between an ordinary stearine candle and a petroleum lamp. When the frame is equally distant from the two unequally bright flames, the grease spot can be seen plainly on both sides. By moving the frame with the sheet of paper slowly toward the less bright light, that is, the stearine candle, it will arrive at a point where the grease spot has apparently disappeared on both sides of the paper. This illusion always exists when an equal lighting power prevails on both sides of the paper, and there is no side light. This is the point at which to determine how much stronger is the light of the lamp than that of the candle. If the candle is 20 inches from the paper and the lamp is 60 inches, and yet both sides of the paper are equally bright, the light of the lamp will be as strong as that of nine candles. The calculation is based upon distances, the figures of which are multiplied by themselves, and then divided. In this case, for instance, 60 multiplied by 60, divided by 20, multiplied by 20, equals 9. This, of course, is a very primitive method, but it embodies the principle utilized in the delicate measurements of the laboratories. The grease spot always remains the base of the modern instruments for measuring light, whether it is replaced by milk glass, or it appears as an ideal grease spot in the place of an uncovered point of a mirror. The unit for measuring light is now the so-called Hefner candle. This candle consists of a wick, saturated with acetate of amyl. Its flame has a height of 40 millimeters. It is used more particularly when the sources of light possess naturally a certain similarity. The comparison of the power of red gas light with that of white arc light or incandescent light is made most accurately by special instruments.

AMONG the advantages claimed for paper tiles, one of the latest products of the wood-pulp industry for roofing purposes, are their light weight, exceeding hardness, and non-conducting of heat and sound, and sufficient elasticity to meet all the requirements. There is also freedom from the dampness usually experienced in the case of stone. The new material is pronounced superior in quality, appearance and price, and from an insurance standpoint seems to be regarded as safe and satisfactory.

THREE German engineers, in discussing a recently proposed plan for operating a street railway with gas, estimate the cost of a street railway equipped for gas operation would cost $28,560 per mile. The cost of the gas road at Dessau was $27,798.40 per mile. A 10-horse power gas tramway car uses about thirty-two cubic feet of gas per car mile.

INVESTIGATION has lately demonstrated that coal may lose as much as 33.08 per cent in weight from exposure to the weather, while the loss is made even more considerable by the deterioration in quality.

IN tropical forests so large a proportion of the plants are of the sensitive variety that sometimes the path of a traveler may be traced by the wilted foliage.

A UTAH inventor claims that by methods devised by him onyx can be used as a substitute for lithographic stone.

Commercial Paragraphs.

THE Risdon Iron Works will next week ship a complete air compressor plant to the Leonard mine for the Boston & Montana Co.

GEO. E. WOODBURY has just returned from Calaveras Co., where he has been placing seven Woodbury concentrators for the Carson Creek Mining Co.

THE Prospective Mining & Machinery Co. of this city shipped one Tremain steam stamp mill to J. M. McKearnan, Porterville, Cal., on the 20th inst. This mill is making its way among practical miners.

A. BARNES, manager of the California Stump Puller Co., is this week shipping a complete stump-pulling outfit to Guaymas, in the State of Sonora, Mexico. It is claimed that these machines can't be stumped.

—The California Electrical Works, whose place of business has been at No. 35 Market street for so many years, has secured a more commodious establishment at 409 Market street, into which it will move about August 15th, increasing business necessitating more extended facilities.

THE Edward P. Allis Co., 9 Fremont St., S. F., has an order for the complete machinery of a new reduction works to be built in Colorado, including the engine, boilers, crushers, rolls, concentrators, chlorination barrels, etc. The sawmill department has had an order placed with them for the complete machinery of a large sawmill for northern California.

THE Westinghouse Electric and Manufacturing Co. has made a contract with the Baltimore, Cantonsville and Ellicott City Railway Co. for thirty-two 100-horse power and twenty 30-horse power electric motors for its new railway. The heavy motors will be used for long runs between Baltimore and Washington and the smaller ones for short runs in the city.

THE Sullivan Machinery Co. of Chicago have appointed Knight & Stone agents at Rossland, B. C., to introduce their diamond and rock drills in that section. While the agents have only been representing the Sullivan Machinery Co. a short time, they have met with flattering success. The style of drills made by this Chicago house seems to be adapted for work in that territory.

THE International Correspondence Schools, at Scranton, Pa., under date of July 1st, writes: "Our schools were never so popular as at present. We have just reached the 13,000 mark, over 5000 having enrolled in the past year. Our great growth obliges us to erect buildings to accommodate our instructors and facilitate their work. These buildings, which will cost us $100,000, are now under way."

Obituary.

A. U. RUGG, a prominent Plumas Co. miner, was drowned at the middle fork of the Feather river, near Cleghorn bar, last Saturday.

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

SIERRA COUNTY—Continued.

NAME OF MINE.	Character of Mine.....	No. of Men Employed.	Location.	Name of Superintendent or Agent.	Address.
Feather River	Drift.	70	1½ m SW of Gibsonville.	W. C. Wingate, Supt.	Gibsonville
Gold Valley	Gold.	50	12 m NE of Downieville.	Capt. Buckley, Owner	Downieville
Gold Bluff	"	.....	2 m NE of Downieville	G. Costar, Own	Downieville
Golden King	"	15	3 m NE of Alleghany	W. J. Adams, Supt	Alleghany
Golden Star	"	2	1¼ m NE of Downieville.	C. M. Wilson, Supt	Downieville
Good Title	"	4	14 m S of Comptonville	J. J. Dailey, Own	Dobbins Ranch
Holloway Mine	"	10	8 m NE of Gibsonville	Spencer & Gould, Own	Gibsonville
Homestake	"	4	10 m NE of Sierra City	Atkinson Bros., Own.	Sierra City
Hughes & Westfall	"	20	9 m N of Sierra City	H. Hughes & E. J. Westfall, Own.	Sierra City
Hanley & Co	Gravel	11	French Ravine	Mrs. Hanley & Son, O'n	Alleghany
Higgins Mine	Gold.	8	14 m SW of Comptonville	J. Rogers et al, Own.	Dobbins Ranch
Last Chance	Gold quartz.	5	7 m N of Sierra City	F. Cadoce, Own	Sierra City
Mountaineer	Gold.	10	9 m N of Sierra City	E. Berger, Own	Sierra City
Martine & Keystone	"	.....	4 m NE of Sierra City	M. Meade, Own	Sierra City
Mammoth Springs	"	5	3 m E of Allenhany	D. Dever, Supt	Alleghany
Mariposa	"	10	1 m S of Alleghany	H. Appel, Supt	Alleghany
Minnesota Devel. Co.	"	8	1½ m SE of Alleghany	J. O. Jones, Supt	Alleghany
North Star	"	11	¼ m NW of Forest City	J. O Jones, Supt	Forest City
Pioneer Mine	"	35	1½ m N of Portwine	G. S. Diesen, Supt	Portwine
Pacific and Alta	"	.....	1 m N of St. Louis	D. Cowlan, Own	St. Louis
Phœnix	"	.....	1 m NE of Sierra City	W. Bush, Own	Downieville
Plumbago	"	30	2½ m S of Alleghany	J. M. Taylor, Own	Nevada City
Rising Sun	"	.....	1½ m E of Alleghany	Incorporated Co	
Rainbow Mine	"	2	1½ m S of Alleghany	J. O. Groves, Supt	Alleghany
Slate Creek Gravel	"	18	6 m E of La Porte	W. A. Scrution, Own.	La Porte
Sierra Gold Co	"	4	2 m E of Downieville	C. Purdy, Supt	Downieville
Slug Canyon Tunnel	"	7	1½ m E of Downieville	J. Copeland, Supt.	530 Cal. St., S. F.
South Fork M. Co	"	7	¼ m SW of Forest City	J. O. Jones, Supt	Forest City
St. Charles Hill	Gravel	.....	2 m W of Goodyears	Incorporated Co., Own	Glasgow, Scotland
Snowdon	Gold.	6	2 m SE of Alleghany	L. Evans, Own	Alleghany
True Fissure	"	5	15 m NE of Downieville		
The Chips Mine	"	6	1½ m E of Sierra City	J. Sullivan, Supt	Sierra City
Tippecanoe	"	5	5 m E of Comptonville	J. Perrant, Own	Tippecanoe
William Tell	"	.....	2 m E of Sierra City	E. Jost et al, Own	Sierra City
Wide Awake	"	8	7 m NW of Downieville.	J. Brandt, Supt.	Downieville
Young America	"	.....	9 m N of Sierra City	Incorporated Co	

SISKIYOU COUNTY.

Altoona	Gold.	.....	Quartz Valley	Chas. Roberts	Etna
American Bar	"	20	9 m W of Hornbrook	J. C. Badger	Hornbrook
American Mine	"	2	2 m S of Henley	C. B. & J. O. Jillson, Owner.	
Algren Claim	"	4	5 m W of Sawyers Bar	A. Algren, Own.	Sawyers Bar
Anderson	"	3	2½ m S of Sawyers Bar	John Anderson, Own.	Sawyers Bar
Ampback (Fagunda)	"	5	3 m S of Sawyers Bar	R. L. Fagunda, Own.	Etna
Abers	"	2	5½ m SW of Callahans	Thos. Abers, Own	Callahans
Albe s Claim	"	3	14 m W of Cottage Grove	Henry Albers, Own.	Cottage Grove
Auberry Claim	"	3	1 m W of Cottage Grove	Roland R. Auberry, O'n	Cottage Grove
Blind Lode	"	2	Oro Fino	H. J. Diggles	Fort Jones
Bonanza	"	14	2½ m N of Hoopersville	H. J. Diggles	Fort Jones
Big Ben	Placer.	6	Quartz Valley	S. E. Adams	Fort Jones
Big Ledge	Gold quartz.	.....	Quartz Valley	H. J. Diggles	Fort Jones
Barnes	"	3	Quartz Valley	J. W. Garden	Oro Fino
Brass Wire	Gravel	4	Henley	W. H. Smith & A. Harvey	
Black Lead	Gold.	10	Yreka	Mrs. B. Lee, Own., & J. W. Schild	
Blue Gravel	"	10	Yreka	A. Lee, Own.; Rainer, Austin & Lee, Les's.	Yreka
Black Jack	Placer.	.....	Hornbrook	W. H. Ritchie, Secy	Henley
Beamer	Gold.	.....	10 m NE of Sawyers Bar.	Heirs of Jim Carr	
Basiettes	Drift.	2	Sawyers Bar	Chas. Basiettes	Sawyers Bar
Brazil	Placer.	8	Hawkinsville	Manuel Brazil	Hawkinsville
Blake's Claim	Gold quartz.	2	Sawyers Bar	Peter Blake	Sawyers Bar
Burns Claim	"	4	2 m S of Sawyers Bar	Wm. Burns	Sawyers Bar
Bigelow Claim	"	4	4½ m N of Sawyers Bar	G. F. Bigelow	Sawyers Bar
Buckeye Bar	"	15	Near Walker P. O., Klamath River.	Chinese	
Bayle Mine	"	18	14 m NW of Yreka	Osborne & Gonzales	S. F.
Beard Claim	"	2	9 m W of Cecilville	Beard Bros	Black Bear P. O.
Blackburn Claim	"	8	6 m S of Summerville	Blackburn Bros	Coffee Creek
Brown Mine	"	2	6 m S of Cecilville	Thos Gearge	Cecilville
Bloomers Claim	"	5	6 m W of Forks of Salmon	W. P. Barnett, Own.	Salmon
Bonersox	"	.....	Somes Bar	H. Bonersox, Own	Somes Bar
Black Bear	"	46	8 m S of Sawyers Bar	Ben Daggett	Black Bear P. O.
Benders	"	.....	7 m S E of Etna	W. Chambers et al, O'n	Etna
Bennett	"	2	Scotts Bar	Wm. B. Bennett, Own	Scotts Bar
Brady	"	4	Scotts Bar	A. Brady, Own	Scotts Bar
Brunt Claim	"	3	½ m W of Scotts Bar	John Brunt, Own	Scotts Bar
Burke Claim	"	2	1 m W of Oak Bar	Wm. Burke, Own	Oak Bar
Barton Claim	"	2	½ m W of Oak Bar	H. J. Barton, Own	Oak Bar
Barton & Lange	Quicksilver.	.....	4 m N of Oak Bar	H. J. Barton et al, Own	Oak Bar
Barton & Litchen	Gold.	14	5 m N of Oak Bar	Sing Co. (Chinese)	Oak Bar
Buckeye Bar	"	16	3 m E of Oak Bar	Chinese Co	Oak Bar
Boles Claim	"	2	15 m NW of Oak Bar	W. Robertson	Scotts River
Bebee Bar	"	14	1½ m N of Scotts River	Quong Hung Co	Oak Bar
Billups	"	2	11 m NE of Scotts Bar	Robt Billups	Oak Bar
Better Set	"	1	13 m NE of Scotts Bar	C. E. Humphrey, Own	Scotts Bar
Bailey Claim	"	2	6½ m W of Ceiad	C. M. Bailey, Own	Ceiad
Butza	"	4	10½ m W of Happy Camp	Jean Butza, Own	Happy Camp
Berry	"	2	5½ m E of Happy Camp	John Berry, Own	Happy Camp
Bunker Hill	"	5	15 m W of Happy Camp	Geo. Temple, Own	Happy Camp
China	"	.....	Quartz Valley	Chas. Roberts	Etna
Campbell Mines	"	15	Quartz Valley	Chas. Roberts	Etna
Cannon Claim	"	2	Oro Fino	Jack Cannon	Oro Fino
Carson & Cradle	"	.....	Oro Fino	Carson & Cradle, Own	Oro Fino
C. B. & Q	"	.....	Oro Fino	David Ray et al, Own	Oro Fino
Challenge	"	3	Deadwood	Lewis Davis, Own	Fort Jones
Consolidated Sycnash	Placer	.....	5 m N of Fort Jones	H. B. Madison	Fort Jones
California Bar	Gold.	6	6½ m W of Hornbrook	Ellis, Price & Co	
Charter Oak	"	.....	3 m NW of Hornbrook	J. W. Lettner	
Coal Beds	Coal.	.....	Mrs. Wise's Ranch	Mrs. Wise	
Con. O'Donnell's Mine	Gold.	12	1½ m SW of Hawkinsville	Con. O'Donnell (leased to Chinese).	
Carl & Shaw	"	.....	5 m SE of Sawyers Bar	Carl, Shaw, et al	Sawyers Bar
Cronin's Claim	"	2	6½ m W of Sawyers Bar	Pat Cronin	Sawyers Bar
Casey Claim	"	6	2½ m S of Sawyers Bar	Smith & Hamilton	Sawyers Bar
Chen Song	"	8	Near Oak Bar	Chinese	
Charter Oak	"	2	Cherry Creek	D. Barnes, Own	
Chinese Claim	"	5	Near Humbug Creek	Chinese Co	
Centennial	River & bar.	.....	Gottville	Wm. S. Gott	Gottville P. O
Chinese Claim	Gold quartz.	26	Yreka	Chinese Co	Yreka
Charter Oak	"	2	11 m SW of Yreka	Chinese Co	Yreka
Chinese Claim (formerly Jno. Jones)	"	6	18 m N of Yreka	Chinese Co	Yreka
Claughry's Mine	"	4	14 m NW of Yreka	C. C. Humphreys et al	Yreka
Cartwright & Phillips	"	4	16 m NW of Yreka	Cartwright & Phillips	Yreka
Conzetti	"	2	8 m S of Summerville	S. Conzetti	Cecilville
Conzetti	"	2	1 m W of Summerville	S. Conzetti	Cecilville
Cash Claim	"	3	3 m SE of Forks Salmon	Parker & Sons	Etna
Cameron	"	2	6¼ m SE of Forks Salmon	J. Cameron	Black Bear P. O.
Crapo	"	5	3 m SE of Forks Salmon	Bennett & McLaughlin	Forks of Salmon
Chain Gang	"	4	3½ m SW of Callahans	Fred Hellmuth, Own	Callahans
Carter Claim	"	2	6 m SW of Callahans	Jas. Carter, Own	Callahans
Cummings	"	.....	3½ m SW of Callahans	T. K. Cummings, Own	Callahans
Carey	"	3	7 m S of Etna	Lewis Carey, Own	Etna
Crawley	"	2	1¼ m SW of Callahans	J. R. Sears et al, Own	Callahans
Curtis & Smith's Claim	"	4	1¼ m S of Scotts Bar	L. B. Curtis et al, Own	Scotts Bar
Columbia	"	.....	8 m NE of Scotts Bar	Columbia G. & S. M. Co., Own.	Scotts Bar
Crawford Claim	"	2	Scotts Bar	A. Crawford, Own	Scotts Bar

—*Begun in issue of April 25, '96. (To Be Continued.

Professional Cards.

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—AND—
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Member Institute Electrical Engineers, London.
Carrville . Trinity County....California.
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☞ Correspondence Invited.

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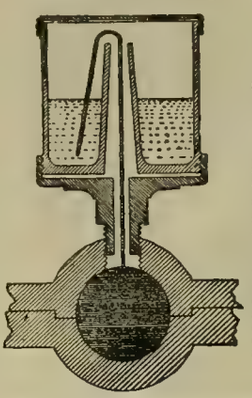

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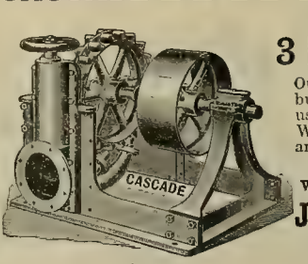

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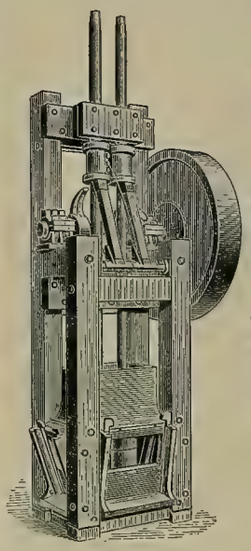
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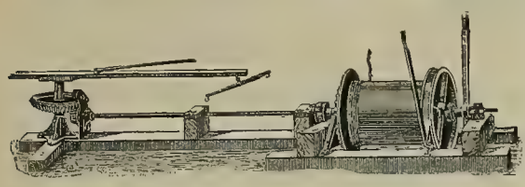
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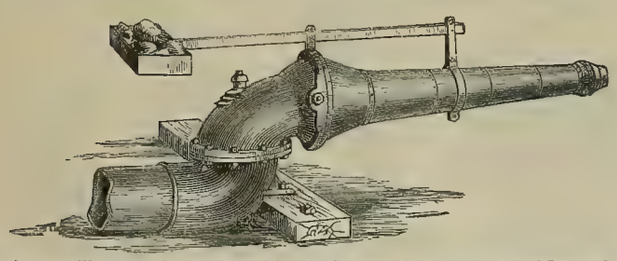
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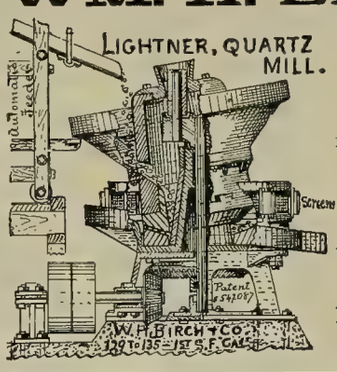

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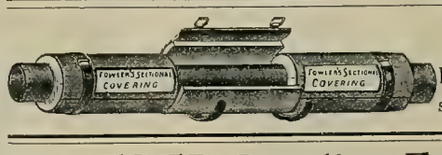

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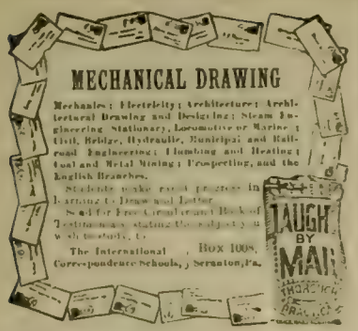
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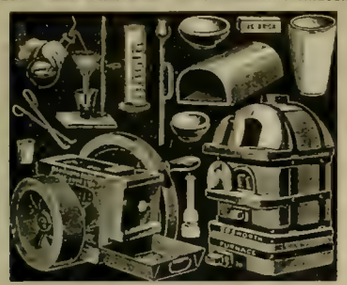

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The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1880 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis. The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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Mining Summary.

CALIFORNIA.

Amador.

Record: At the Wildman mine, Supt. Ross has had an entire new foundation built under the hoisting machinery at the main shaft. Underground work was continued as usual except the hoisting and extracting of ore, the men entering the mine by way of the Mahoney shaft 1100 feet distant.

At the Central Eureka Supt. Thomas is putting in a four drill air compressor and two No. 6 pumps.

The *Record* hears that the California Exploration Company wants to buy the Gwin mine and that the owners say they will sell for $3,000,000.

Butte.

M. Higgins reports the discovery of a ledge of limestone eighteen miles north of Chico.

The Chinese contractor who has the Big Bend mine leased this year is making extensive preparations for working the mine, says the Oroville *Register*. He has sixty Chinamen at work near the Mosley place on Berry creek, building trails to Berry Creek bar, Bloomer bar and Lattimore bar, to enable him to get his lumber and supplies down to these localities.

J. L. Hicks has been engaged to superintend the Quimby-Jake mine on the Feather river. The company is now sinking a 24x24-foot shaft and will put an engine to work pumping next week. Men are employed sinking the shaft, which the owners are satisfied will locate rich gravel by the time bedrock is reached.

Near Lovelock the Ramsey Bar mine is working eight men and taking out a good deal of gold. Seven men are employed at the Best mine, where a 400-foot bedrock tunnel is being run.

At the Enterprise E. W. Slater is making a connection between the shaft and tunnel in his quartz mine. He has a 10-foot steam arrastra with a crushing capacity of six tons in 24 hours. The Red Point, or New Oregon, mine is one and a half miles east of Enterprise. The owner, Mr. Champion, is running a 150-foot tunnel 140 feet below the works. Nine men are employed. There is no mill or arrastra on the mine. Fred Bachman at the Crystal Hill mine employs four men and has a 4-stamp mill with a capacity of six tons a day.

Calaveras.

Citizen: Work on the Holland tunnel is going ahead. Men have been put to work on the old Union mine, a property that has lain idle for a number of years. Crosscutting has commenced in the Mester mine near North Branch. A new hoist has been erected at the Esperanza mine, and the capacity of the mill increased to 10 stamps, making 30 in all. Work on the Marshall mine progresses nicely. The taking out of gravel will soon commence. The Cassinelli gravel mine on Central Hill has started. Men are at work for the California Exploration Company near Sandy Bar, on the Mokelumne river. A wing dam is being built above the point where the proposed electric plant will be located. Men are grading for the 10-stamp mill to be erected on the Fellowcraft mine. The machinery is already on the ground. The Venus mine at Campo Seco, formerly operated by Casey & Crocker of San Francisco, has been reopened by C. G. Leisinski, a Chicago capitalist. Two working shifts are sinking a shaft. It is the intention to sink 500 feet. A strike is reported in the Thorpe mine, some of the rock assaying as high as $400 per ton. A large mill will soon be erected on the property.

The following is from the Angels *Voice* of July 22nd: Early in February Dr. Jerome Porter of Angels sold the Macau mine at West Point to H. Colburn, Col. J. T. Grayson of New York, Mr. Gillette of Chicago and Mr. Ford of Denver for $80,000; several monthly payments of $500 each were made. During the six months that the company had the property they spent $12,000 in machinery and improvements. Mr. Godbe as expert for the company was to receive a sixth interest for his services.

A large payment was due on the joint bond of the company and the promoter on the 15th of the present month—that is, the time agreed on was the 10th to provide for emergencies, with the 15th as the last day of grace. The 15th came around, but no money from the company. Having learned that Porter had paid $10,000 for the property, they determined to let the bond go by default and then secure the property on their own terms, as they supposed that the middleman would be placed without means to meet the payment due on his bond, and thus secure the property at a saving of about $68,000. But Porter had provided for this emergency by securing other backing, and thus fortified he went to Solinsky, the attorney for the company, and asked how long the time for settlement would remain open. "Eight o'clock," said Solinsky; "we can't stay up till twelve." At five minutes to eight Porter went up to the office, where he found the attorney. When Solinsky told him that nothing had been done, Porter produced the money and secured the property with improvements and machinery to the value of $12,000. He learned subsequently that the company telegraphed to Solinsky the next day to protect the property and the funds would be forthcoming.

Work will be pushed at the Machu, which is now down 130 feet, and drifting will be done as well as sinking.

At the Gwin mine the shaft is down 1300 feet. Sinking will be continued to the 1400-foot level. The daily average amount of water from the shaft is 12,000 gallons.

Del Norte.

Record; Beach mining is still being carried on at Crescent City by Edward Yates. Seven men are employed daily and about 100 tons of sand are washed every eleven hours. The machine used is one invented by Mr. Yates from ideas gained from years of beach mining here and in Curry Co., Oregon. It is claimed to be the best gold-saving machine ever worked on the Crescent City beach. The beach will be worked until such time as the water supply fails. Water for washing the sand is secured by means of a steam pump from ponds in the fields adjacent to the beach. A run of seven weeks has been made on an old back beach without moving the machine.

Work will soon commence at the Coon Mountain Consolidated Gravel Mining Co.'s claims. A letter from Chicago states that contracts have been let calling for the employment of 75 men, work to commence at once. The opening of these claims will call for a considerable amount of money for machinery, labor and transportation from this place before working of pay dirt can be begun.

El Dorado.

(Special Correspondence). — The Amazon mine, eight miles north of Placerville, is being rapidly opened. The shaft has reached a depth of 40 feet and is on a 5-foot ledge of $15 free-milling ore.

The Boulder Mining Company began operations sixteen miles southwest of here on April 10th. Meanwhile they have completed 1500 feet of underground work, 2600 feet of tramway, seven miles of road, eight miles of ditch, offices and boarding house, and a 10-stamp mill ready for operation the 1st of August.

The Newton gravel mine, six miles east, has completed 150 feet of tunnel and crosscut drifts. The 10-stamp mill was started last Monday.

The Lucky Marion, near Greenwood, is drifting on the 100, having run 125 feet, with skip and track in place. Mr. Neir is driving the development work with system and dispatch.

Work on the Larkin is progressing with very satisfactory results in its development. The station on the 250 is completed, and drifts are started on the intermediate levels. The Bostonians and San Francisco people interested in this property are sparing neither money nor energy to develop this mother lode proposition.

The Oakland and Garibaldi mines, near Greenwood, are showing encouraging results in the preliminary work thus far accomplished. The owners, all of San Francisco, are opening an old tunnel that will tap the ledge at 250 feet. The ore body is large and of much merit.

The old St. Lawrence, eight miles north of Placerville, is receiving attention after an abandonment of seventeen years. It was worked with a 20-stamp mill and produced over $600,000 with its crude machinery of the day and with no attention to saving sulphurets. The shaft was 800 feet and there were two winzes, but there was no crosscutting. The old St. Lawrence may yet prove a new surprise as a California mine in its renewed development work.

Placerville, Cal., July 28, '96.

Republican: The Vulture mine on Poverty Point belt, in which the Gentle Annie is located, is yielding some fine specimen rock. It is a white quartz well streaked with gold in bands and nodules. There are two ledges which are being developed, one containing the quartz above noted and the other three feet width of a dark-blue variety which is also considered valuable. The owners are J. W. Dench and W. Craddock, the latter being the superintendent.

Inyo.

Register: The Red Jacket is eight miles south of the Tule canyon placers. The ledge is nearly 3½ feet wide, with a 9-inch pay streak and quartz seams in clay giving $20 assays. The ledge is red and brown oxidized porous quartz, and the pay streak is on the foot wall. The country rock is syenite, the ledge having clay slip walls. When the owners wish to get out a few dollars they can easily get it by putting down a canvas, taking down loose pay ground and running it through a dry washer. At present they have about twenty-five tons of $40 rock and an equal amount of $20 ore. The nearest water is a 70-foot well two miles distant, the quantity being sufficient for milling but not enough for any power except steam. Wood is abundant and there are good roads to mine and water. It is about five miles to Cottonwood creek. A horse arrastra has been built.

P. Keyser lately shipped 4400 pounds of silver rock from his mine in Alida valley to Selby & Co., and received in return, after paying all expenses, $3412. Silver glance and native silver constituted the ore.

Nevada.

The Grass Valley Miners' Union has elected Noah James, president; F. R. Bawden, vice-president; E. F. Whiting, recording secretary; W. H. Bawden, treasurer.

Union: The 40-stamp mill at the Providence mine is to be overhauled and repaired. About thirty men have been temporarily laid off.

The Red Dog Mining Co. has its machinery erected and has commenced the work of sinking a shaft to strike the gravel channel. The mine is situated in Missouri canyon, near Red Dog. The shaft is now down about 35 feet and it is expected that at a depth of 200 feet the channel will be encountered. Some fine gravel has been taken through the lower tunnel.

Plumas.

National-Bulletin: The Harrison mine, Coquette creek, Granite Basin mining district, will soon begin running a tunnel to develop the ledge at greater depth. It is expected to drive this tunnel 600 feet, which will tap the ore body from 300 to 400 feet below the present workings.

See & Jolly have developed a rich body of ore. They are running a small mill night and day.

San Diego.

(Special Correspondence).—A half interest has been sold in the N. G. mine, Rice mining district, Warner's Ranch, to Captain Farnsworth and Perry Bevington, both of Escondido. The main shaft is down 122 feet; two drives, one at the 30-foot level and the other from 85-foot level, run 15 feet into a chute of honeycombed quartz. The chute is perpendicular.

The N. G. is the only mine in which a force of men are at work in the Rice district. At Chewawa, twelve miles north of the Rice mining district, some good ledges have been found by the Rice brothers. One in particular the surface rock goes by assay $126. This ledge is 15 feet wide—good live quartz of a honeycombed nature, impregnated with iron. There is plenty of wood and water. There is a little surface gold found in places. Bill Rice took out $35 worth in less than a week in a small creek which is close to the big ledge.

July 25, '96.

The Golden Cross Mining Company's group of thirty claims is at Hedges, Ogilby Mining District, five miles north of Ogilby station, on the S. P. R. R., eighteen miles west of Yuma, Arizona. There are a number of quartz ledges. The strike is N. E. to S. W. and dip south-east. The country rock is granite, gneiss and hornblende schist. The ores are gold and free milling. A little silver occurs. Much of the ore is copper stained, some stained with iron oxide. These do not affect amalgamation. The company has done most of its development on three mines, the Golden Queen, Golden Cross and Golden Crown.

The Golden Queen surface croppings show a length along the course of the ledge 700 feet and 150 feet wide. Work was commenced in the first croppings, an incline shaft at an angle of 30° is down 650 feet with ore in the bottom. The working levels in this mine are at 100, 150, 200, 300, 400 and 500. The great mass of ore is low grade. The 100 is worked out except pillars that support the roof of mine. The 150 is only partly worked out, ore is being taken from that level at this time. All this ore will average $10 to $15. A 4-foot streak of white quartz, splotched with copper and iron stain, nearly 100 feet long, in this working averages from $10 to $200 per ton. On July 1st, '96 there was estimated 6000 tons of ore on this level. The 200-foot level contains a stope 200 feet by 150 feet and 54 feet high. The 150 and 200 are timbered with square sets. There is some good ore yet in 200, probably 4000 tons. The lateral development on these workings is about 200 feet. The 300-foot level is a stope 160 by 80 feet, 54 feet high, with a wing 30x100, 54 feet high and a wing 60x40, 30 feet high. There is yet probably 12,000 tons of ore in this stope which will average $10. The 400-foot level is a stope 180 feet by 60 feet and 54 feet high, east wing 80x60x30. The vein or ore body in the 400 becomes more concentrated, cleaner and a more even grade than any ore in the upper workings; there is yet some 10,000 tons in this stope. The ore from this working graded up all the ore milled for seven months to a battery assay of $9.75 average. The 500-foot level is the continuation of the same ore body and is practically the same ore as the 400. This level is opened up and beginning to furnish ore. The indications are that the ore in the botton of inclined shaft is the ore from the second or southerly surface cropping; the ore from the 400 and 500 should be found farther east on the 650-foot level. If this is the case there will be two veins or ore bodies to work on at this level. The gold from this mine grades high, varying from above 800 fine to 940 fine, and has yielded at mint from above $18 to $19 per ounce.

The General Miles mine, joins the Golden Cross on the south line; the ore of these two mines being the same, and the two claims side by side being necessary to cover the area of the deposit. The Golden Cross is developed on the 200-foot level only, 200 feet by inclined shaft 45° pitch. The stope is 185 feet long, 135 wide, and 100 high. A winze from floor of 200 is now down 45 feet, and shows higher grade ore than anything above it, assays from $8 to $15. The incline shaft is down 75 feet below the 200, and the 300-foot level will soon be opened up. The ore in the 200-foot stope is low grade, running from $3 to $5, with rich streaks running through it. The waste and very low grade rock is left in the setts, and the entire mass sent to mill runs from $3 to $5, occasional richer strata grade it higher. The 300-foot level will show a much better average. The company considers there is ore here for a 100-stamp mill for twenty years.

The Golden Crown mine is similar to the others, has the same general character of ore and grade is higher than Golden Cross. It has three working levels, 100, 200, and 300 feet, the best ore is at the 300, though there are rich streaks in both the other workings. The output averages from $5 to $8.50 battery assay. The incline shaft at an angle of about 40° will soon be sent down another 100 feet. Indications all point to the conclusion that the three ore chutes in this mine will unite at the 400 or 500 foot level. All the levels are timbered with square setts. The General Miles, the Talmadge, the Danube, the Beecher and the Ingersoll are not yet fully developed, although considerable work has been done on all of them.

The camp is a horseshoe canyon, and the several mines surround it and cover the ground of the canyon as well. The claims or locations all join end and end, and several of them lap; the ground is entirely covered.

The company has a 40 stamp mill, 850-pound stamps, all in running order, 20 stamps of which were started up September, 1893, and the other 20 were started March, 1894. The 100-stamp mill was finished November, 1895, 1000-pound stamps, and complete in every particular. The machinery consists of one double cross compound Corliss engine, capable of developing 350-horse power, an air compressor, electric light and power plant, four boilers, four hoisting works complete and rock crusher. The company pumps water from the Colorado river, and has two pumping plants, each capable of furnishing 300,000 gallons water per day, and a twelve-mile, six-inch pipe line. The company also has two reservoirs—one for each mill and large enough for domestic supply also. The company's store and boarding house both do a good business and show good profits. The operating expenses run from $500 to $600 per day, and the minimum amount of monthly cleanup will not fall short of $40,000. The camp has a population of some 450 people.

Following is the date and result of cleanups for the year ending June 18, '96:

Date of Cleanup.	*Ounces Bullion.*	*Gold.*	*Silver.*	*Net Value.*
June 8, 1895...	915.50	17,467.83	24.83	$17,435.02
June 29, " ...	882.35	16,251.61	18.07	16,215.11
July 29, " ...	899.54	16,921.56	25.67	16,800.61
Aug. 17 " ...1019.60		19,095.76	28.45	19,066.16
Sept. 10, " ...	795.30	11,919.19	19.68	11,889.96
Oct. 1, " ...	321.17	5,683.13	7.36	5,664.84
Oct. 17, " ...	236.90	4,179.72	5.35	4,165.89
Nov. 2, " ...	237.80	4,030.92	8.68	4,020.37
Nov. 13, " ...	.....	.....	.....	5,555.37
Nov. 30, " ...	437.40	7,233.47	22.20	7,323.37
Dec. 14, " ...	353.50	5,827.72	23.20	5,826.36
Dec. 28, " ...	.....	8 102.84	57.98	8,164.84
Jan. 4, 1896...	228.62	3,393.25	30.59	3,407.65
Jan. 15, " ...	218.00	3,762.88	11.13	3,760.55
Jan. 15, " ...	250.85	3,593.56	40.76	3,623.93
Jan. 30, " ...	628.07	9,847.87	70.28	9,895.37
Feb. 15, " ...	608.34	9,173.82	77.92	9,210.30
Mch. 9, " ...	958.20	14,172 18	95.12	14,208.70
Apr. 2, " ...	357.39	5,832.74	24.43 }	17,476.26
Apr. 2, " ...	776.14	11,609.48	64.76 }	
Apr. 21, " ...1192.74		20,205.00	89.23	20,213.57
May 1, " ...	547.70	8,961.32	51 67	8,975.51
May 21, " ...	778.20	12,412.94	87.79 }	17,620.29
May 21, " ...	321.00	5,179.13	25.60 }	
June 6, " ...	.....	.....	.....	8,513.03
June 18, " ...	.....	.....	.....	9,187.43
Total.....				$249,304.59

Shasta.

C. H. Behrens has sold his mine to Wells and Stevens. The *Courier* says they will take their ore to Keswick.

Courier: The laborers on the Muletown and Brandy Creek ditch get 90 cents a day. The ditch is to be 5 feet on top, 2½ feet deep and about 3 feet wide at the bottom. The contract price was $2.50 for pick and shovel ground and $4 for blasting ground per rod. Water will be taken from Brandy creek by means of the old ditch by Bear Trap, turned into Boulder creek, and the new ditch from Muletown will be constructed to tap Boulder above the Paige ranch. The water will give the Baer and Simons company about eight months piping on its gravel claim near Muletown.

Siskiyou.

Journal: The Distlehorst & Barton Dredging Co. will start August 10th.

The Horse Creek mine closed down last week, owing to a break in the ditch.

The owners of the Horse Creek China river claim in their cleanup realized 18 ounces, or about $300. There are large beds of rich gravel all along the Klamath, which will be easily handled by the dredger.

Chamberlain & Timmons think of erecting a mill on Mill creek, near the Mable mine.

The Seattle Placer Mining Co. shows what capital will do when judiciously invested. The old Shinar mine, which they bought through T. J. Nolton, is paying well, and, having built a fine ditch to the mine, they are now in a position to work the mine the year round.

Journal: The Ben Shinar placer mine and a tract of ground below it on the Klamath river, in the Seiad mining district, have been sold to Mr. Simons of Denver, Colo., for $15,000. Three miles of ditch flume will be constructed, taking water from Thompson creek, which will reach the north bank of the river, and the water will be taken across in an 18-inch pipe, suspended on wire cables. This mine is rich in gold—$10 a day to the man was made while prospecting it.

The miners around Oro Fino and other mining camps throughout the county are busy making cleanups, and some of them are doing exceedingly well, most of the hydraulic miners having had an excellent season, as the water held out much better than they expected it would. The quartz miners in every part of the county have done better this year than usual, and a number of new and promising ledges have been discovered. The great difficulty with quartz mining has always been the expense of getting the ore to a mill for crushing, but a number of small mills have been erected during the past year, which have been the means of opening up several good paying ledges.

NEVADA.

HUMBOLDT COUNTY.

C. H. Wilbur, manager of the Golden Eagle mine, tells the *Tribune* that at present the development of the property is confined largely to the main tunnel that has penetrated the hill for a distance of 168 feet, of which distance 102 feet is on the ledge. For the first seventy-five feet the pay streak averaged about fourteen inches. The present face of the tunnel is about 140 feet from the point at which the upraise will be made for connection with the shaft; and that having been accomplished, extraction of ore will be begun.

OREGON.

BAKER COUNTY.

A. Geiser, superintendent Bonanza mine, has bought the Pyx mine for $15,000.

JOSEPHINE COUNTY.

G. F. Wheeler wires from New York that he goes to Grant's Pass. Money has been raised to equip and develop the mines at Waldo and on the Illinois, and this week Supt. Brown expects to have men at work at both places.

JACKSON COUNTY.

The suits involving the Golden Fleece mine near Ashland have been transferred to the U. S. District Court at Portland, on the petition of E. M. Corliss, who claims to own the mine by assignment from M. A. Graham.

The *Journal* hears that Bartlett's copper

ledge on Indian river has been jumped. It was located some years ago by Green Bartlett, who once owned the Bartlett Springs in this State. He claims that he has performed the annual assessment work on his copper ledge and that it is not jumpable.

LANE COUNTY.

In the Bohemia mines the road is completed to the mill site of the Noonday Mining Company's mine. I. B. Hammond has the contract for furnishing and constructing the mill, three-fourths of a mile from the Annie mine. It will be in operation September 1st. Work is being pushed in the lower tunnel of the mine to tap the vein. Three eight-hour shifts a day are being worked. The tunnel is now in 440 feet. The Music company has its mine and mill in operation and running steadily.

UNION COUNTY.

The Union-Companion mines in Cornucopia have passed into the hands of W. J. Clark, of Montana, and John E. Searles, of New York. The payments, extending over a period of eighteen months, were made in installments of $10,000 every sixty days, and were promptly made when due. The final payment was made on the 19th ult., and the deeds forwarded to Union for record.

WASHINGTON.

Edward Blewett, of the Blewett mine in the Peshastin, near Ellensburg, Kittitas Co., says in twelve days recently he ran through the 20-stamp mill 532 tons of ore and cleaned the plates with a result of $8000, besides the concentrates, and the concentrates will run half that amount.

F. R. Pendleton of Occuda, Wis., is at Snohomish representing the O. & B. Mining and Milling Company; capital, $500,000. They have leased the O. & B. mine in Monte Cristo district and bonded it for $40,000. The company is said to be amply backed by capital.

BRITISH COLUMBIA.

CARIBOO.

Record: The region about Quesnelle will this summer present a scene of extraordinary activity in gravel mining. The six principal dredging companies, owning leases on the Fraser and Quesnelle rivers, are satisfied of the richness of their claims, and are backing their opinions with a free expenditure of money for machinery and supplies, while many smaller concerns and individual miners will be at work drifting and sluicing on the benches and bars.

IDAHO.

On More creek, near Boise, Poston & Reuben have a dredging machine, which works on the principle of a steam shovel, but, instead of a shovel, grapplers are used. When the grappler is spread out it is 6 feet 1 inch long. The grapplers close when they are driven into the ground and lift up all the gravel over 3 inches in diameter. The rock is washed and tossed aside. The small gravel and sand are raised with a pump. They can get a pressure with their force pump of 100 pounds per square inch. Their boiler is 80-horse power and the engine 72-horse. The company will put in a flume 3x2 feet. The cost of operating the machine per day of ten hours will be about $50.

UTAH.

In the report of the Ontario Mining Co. for the year 1895 Superintendent R. C. Chambers says: "All the levels running east from No. 1 shaft, and all running west as far as No. 3 shaft, are practically exhausted and abandoned, and the pumps and machinery have been removed from the shaft. The 700, 800 and 900 levels of No. 2 shaft are exhausted as far as they run east—that is, to the great east faulting fissure—and also west as far as No. 3 shaft. The 1100 level was extended 250 feet, but nothing of importance was discovered. The 1000 and 1200 levels are to be more thoroughly prospected before being abandoned. The 1300 level has been driven west 360 feet. The work on the 1500 level has principally been stoping, and the yield has been good. No. 3 shaft was sunk 150 feet during the year. The stopes above No. 0 level have been very productive, and it will take some time to work out this part of the mine. The stopes on the 100, 200 and 300 levels cannot be depended on for a large amount of ore. The 400, 500 and 600 levels yielded fairly well and nothing was done on the 700. There is some good ground still to be prospected on the 800. The 900 level was run west 1600 feet and some good ground opened up. The 1000 level was run west 1430 feet and the stopes promise to yield well. The greater quantity of ore from shaft No. 3 was taken from the 600 level and toward the surface." The superintendent estimates that it will take two or three years to work out the upper levels above the old drain tunnel, and they should produce a large amount of ore. "From shaft No. 3 west to the Daly line," he says, "we have 500 feet of backs from the 1500 level up to the 1000 level, this being virgin ground which yet remains unprospected, and should produce ore enough to run the mill for some years to come." The drain tunnel was extended west 2135 feet and a drift run north to connect with shaft No. 3. This will be continued to and through the Daly ground. The volume of water running out of the tunnel is 20 inches deep by 5 feet wide, and the flow is 8100 gallons per minute. This water operates an electric light plant, consisting of two generators and four motors, 75 H. P., furnishing 800 lights for the mills and mines and power for the Ontario and Daly machine shops and sawmills. During the year the mill treated 30,250 net tons of ore, of an average assay of 45.48 ounces per ton, saving 92.2 per cent, and producing 1,276,547.88 fine ounces of silver and 951.80 fine ounces of gold. The milling cost was $6.30 per ton and the total operating expense was $22.53 per ton. Compared with 1894 there was an increased tonnage, lower values, higher percentage saved and less cost for production and operating expenses. The cost of extraction, however, showed an increase of 38 cents, owing to the fact that the ore was taken from the upper levels, out of small and narrow seams of low-grade ore that had been passed over in previous years. The bullion product for the year sold for $849,851 and the ore sales aggregated $47,297, the total net proceeds of ore and bullion sales being $855,722. The operating expenses were $685,672, and the cash balance was increased from $267,296 to $462,638, and $84,941 was expended on the electric light plant and water supply. The net cost of the drain tunnel to January 1st was $544,409, and the statement of mine and mill improvements shows a total expenditure of $1,766,185. The total value of all assets is given at $2,337,609, and at the date of the report the company had paid $13,175,000 in dividends. The mine has produced 507,481 tons of ore, containing 31,-903,441 ounces of silver, which sold for $30,211,657.

The old mill that was put up eight years ago by the Lead Mines Company of Bingham for the treatment of ores from the Brooklyn and other claims belonging to it was burned last week. The *Tribune* estimates the loss at over $20,000, with insurance about one-third of that sum.

No better or more eccentric evidence of the auriferous riches that prevail in Little Cottonwood has been seen, says the *Tribune*, than that which was brought in from the property of the Dipper Mining Company. The ore is, perhaps, a departure from anything that has been found in Utah. It consists of a lava-looking material, upon the face of which is seen gold in very pronounced quantity and which will return, perhaps, several thousand dollars a ton. This makes its appearance in a small seam beneath the main ore body, which consists of a decomposed quartz containing free gold. A portion of it has been oxidized, giving it a ferruginous appearance, while upon the face are copper stains.

MONTANA.

The Blackfoot reservation is about to be thrown open and occasions considerable interest thereabouts. The patrol force of the Government has been doubled and the strictest guard is kept against all "sooners." The United States surveying party has commenced work, which will occupy its attention until September 15th. The strip of land is 15 to 20 miles wide and about 60 miles long, and is known to contain rich mineral. Copper and gold predominate. The copper ledges have been known to exist there by old prospectors for many years, but not until last fall could the Indians be prevailed upon to sell it. The amount paid by the Government was $1,500,-000. Years ago prospectors were in that country looking for gold, but quartz mines were overlooked in the search for placer. In those days that country was infested with hostile Indians and many a prospector was lost in oblivion while prosecuting his search through the Blackfoot up into the British possessions. At that time the route was up through the Yellowhead pass into British Columbia. Since then placer mining on the banks of the Saskatchawan has become almost a thing of the past and quartz rock has been discovered in abundant quantities in the Blackfoot.

The Helena & Livingston Mining Co. has mines at Alta and mills at Corbin. Manager O. R. Allen has a dump of tailings estimated to average $6 per ton, to crush which Manager Allen is having built a number of barrel pulverizers, in which round iron balls will be placed and the barrel revolved. These will have an end feed and an end discharge. Each of these barrels will be 6x8 feet, and, to test merits of different linings, they will be lined with porcelain, iron and steel. The whole plant will be run by water power generating electricity. The water is ditched and flumed eight miles, crossing two gulches where inverted syphons are used. The power is transmitted about three miles by wire.

The Philipsburg *Mail* learns that the Sunrise property is to be run on a more extended scale than has been the case during the past few months. Ten of the twenty stamps will be run continuously.

The directors of the Iron Mountain mine have decided to run a tunnel to tap the mine at a depth of 1600 feet. The tunnel will be 5600 feet long and work on it will take fully a year. The cost of this piece of work will be about $70,000. It is said that the driving of the tunnel will effect a saving of 33 per cent in the cost of getting ore from the mine. The ore is now taken from a shaft sunk to the 1600-foot level, and the design is for the tunnel to meet the shaft at this point. As the mine is operated at present the ore has to be hoisted up to the top from the 1600 level and then taken around on cars two miles down to the mills. The tunnel will be cut so as to open directly over the mills. The regular monthly dividend of 1 cent a share has been paid for July, which amounts to $5000.

MICHIGAN.

In '95 were produced pounds of refined copper as follows: Atlantic, 4,382,497; Calumet & Hecla, 77,337,922; Central, 379,020; Franklin, 3,086,933; Kearsarge, 1,946,163; Minnesota, 10,585; Osceola, 6,270,373; National, 40,-128; Quincy, 16,304,721; Ridge, 64,363; Tamarack, 14,900,316; Tamarack Junior, 2,547,861; Tributes, sundry, 37,583; Wolvervine, 1,815,-391. Total, 129,573,856. Total dividends paid in '95: Calumet & Hecla, $20 per share, $2,-000,000; Kearsarge, $1 per share, $50,000; Osceola, $2 per share, $100,000; Quincy, $12 per share, $600,000; Tamarack, $8 per share, $400,-000. Total, $3,150,000.

The total amount paid in dividends by the copper mines of Michigan is $68,460,375.

COLORADO.

Mining Industry: The weekly output of base bullion by the smelters of the State forms a tangible basis of what is being done in the mining industry, which, however, does not include the product of the numerous cyanide mills, which turn out most of the gold. The smelters turned out base bullion for the week ending June 27 in the following values: Pennsylvania smelter, $26,361; Germania, $34,000; Hanauer, $17,550; total, $79,-911. Besides this, the Eureka hill bullion amounted to about $100,000; that of Ontario, $16,800; Daly, $15,200; miscellaneous, $3500, making a total bullion output for the week of $213,411.

Republican: Cripple Creek will probably produce more gold this year than it did last, though it is not believed that the output will equal what was predicted at the close of 1895. Then expectation was at high pitch, and it looked as though the district would soon rival Johannesburg in its production of gold. That expectation was disappointing, so far as the first six months of the year are concerned. But there seems to be no reason to question that the remainder of the year will witness a much larger production than the first half, provided the mill erected for the low-grade ores of the Independence is a success.

Under date of July 24th, F. H. Pettingell, talking of the mining stock market, writes from Colorado Springs: "The entire East is peculiarly indifferent to Cripple Creek mining propositions. Here and there we notice a few who look upon them kindly, but only in an endeavor to get in on a ground floor basis at the expense of their friends or by misrepresentations to the mine owner as to their ability to raise capital for development, which, sad to relate, they invariably fail in doing on occasions when cash is necessary to develop a legitimate mining enterprise of unquestioned merit. Nothing but local capital is available. Many times have I seen a mining proposition hawked throughout the East only to return to be taken up by intelligent Colorado mining operators. The ordinary Eastern man scoffs at our mining industry. Our State would be an abandoned desert without it, as it is even amid general financial distrust bordering upon a panic. Prosperity smiles on us as in no other State in the Union, and will continue to whether we have free silver or not."

NEW MEXICO.

The Fraser group of gold and copper mines, in the Rio Hondo district, Taos county, has been sold to an English syndicate, represented by T. B. Gillespie, for $100,000 in cash and $35,000 in stock. The purchasers have incorporated the Rio Hondo Copper Mining Co., capital stock $5,000,000, and the Cristobal G. and M. Co., capital stock $2,000,000.

Silver City *Enterprise*: Supt. Curtis of the Arizona and New Mexico Smelting Co. says there is a market for the zinc-lead ores and pyrites-zinc ores of this section, which heretofore have been an unacceptable product at the smelters. The smelting works at Canyon City, Colorado, is now in the market for the purchase of such ores.

The Silver City Reduction Works shipped one car (20 tons) of copper matte Monday and will ship another to-day.

W. H. Newcomb has twelve men employed mining iron ore on Legal Tender hill, almost within the city limits.

The turquoise mines at Azure, twelve miles from Silver City, are employing about twenty men at present, under the superintendency of Felix Vogel. These mines are now the greatest producers of turquoise in the world.

At Pinos Altos forty men are employed at the mine and mill. The mine is keeping up its usual product of rich gold ore, running from an ounce and a half to two ounces per ton.

At Mogollon the Confidence mine has eighty men on the payroll. Development work is being pushed on the 100-foot level below the main adit level. Eighty tons of ore per day is being extracted and sent to the mill at Graham, three miles distant.

At La Belle the Ohio men who bought the Midnight group have formed the Midnight Mining Co. At the Midnight two veins have been opened up in the lower drift—the main one being 7 feet wide—from which mill runs by the MacArthur-Forrest cyanide process gave an average of $17 per ton, and mill runs by the Pelatan-Clerici cyanide-electro process gave $15 per ton, the former saving 92 per cent and the latter 99 per cent of the assay value. H. Finch is superintendent.

ARIZONA.

Miner: The Marie Mining Company has bonded a gold mine in the vicinity of El Dorado canyon, Mohave Co., making a partial payment.

It is reported that another attempt will be made by a French syndicate to work the placer beds of the Colorado river, the proposition being to put in a power plant that will melt the cement through the gravel like so much drift sand.

M. D. Lattin and G. Defrance have brought in $500 from the Chemehuevis placer fields. It was taken out by dry washer process during the month of June. Owing to the intense heat, they were unable to work only in the morning and evening. Mr. Defrance says that a great deal of the gravel in their gulch will run $1.50 the pan; that from six 75-pound hoppers that realized $47.60. Wells are now being sunk with fair prospects of getting water. About forty men are now in the district and all are making money. Gold is found the entire length of the range and in the detached foothills.

In the Trench mine at Harshaw, Richard Farrell employs ninety men in the mine and nine in the reduction works. The capacity of the mill is seventy-five tons daily. The ore is rich in silver and lead. The Trench has two shafts, one an incline of 500 feet and the other a perpendicular shaft for 100 feet after which it inclines slightly 200 feet farther.

LOWER CALIFORNIA.

Lower Californian: The mill of the La Fortuna Mining and Milling Company commenced operations this week.

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THREE WEEKS. - - - - - - SEPTEMBER 1st to 19th.

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The Exposition Building will be a blaze of electricity, affording every advantage for the exhibition of all kinds of articles.

Electric Motive Power generated at Folsom, twenty-two miles distant, will turn every wheel and furnish brilliant lights for the entire exhibition. Space, power and light furnished free to all exhibitors.

The Mining Interest will be represented by an exhibit of ores and a series of rock-drilling contests, showing accuracy and dispatch in this kind of work.

Cassasa's Great Exposition Band will give high-class concerts at the Pavilion each evening.

The Manufactures of California can meet the consumer to a better advantage at the State Fair, by reason of its varied attractions, than at any other public gathering in the State. Exhibit your goods and let the people know what is made at home.

Free transportation for exhibits and reduced rates of fare will be given on all railroads. Address the Secretary for information of any character. Premium lists now ready.

EDWIN F. SMITH, Secretary. C. M. CHASE, President.

Coast Industrial Notes.

—The Yuma, Arizona, custom house has been discontinued.

—Southern California has sold 3,000,000 pampas plumes for campaign purposes.

—Recent intensely hot weather has killed the southern California orange scale.

—The Sierra Valleys Railway Company is now running its cars regularly to Claireville, thirty miles east of Quincy.

—For the year ending June 30th the money order department of the San Francisco postoffice received and paid out nearly $6,000,000.

—The Great Northern Railroad Company has given a contract to M. Dow for the erection of a new freight depot at Seattle, Wash., 506x45 feet.

—The Northern Pacific Coal Co. have just completed the loading and shipping of 2500 tons of coal from Roslyn, Wash., destined to San Francisco—the first shipment of the kind.

—Seattle, Wash., is about to build new water works. R. O. Thompson is city engineer. The MINING AND SCIENTIFIC PRESS of January 11, '96, has a full description of the proposed work.

—The annual prophecy of a short pack of salmon on the Columbia is issued. The aggregate at the close of the season will probably not be far from the usual half million cases of 48 one-pound tins.

—All the machinery has been taken out of the Oconta, Wash., mill and shipped to Cosmopolis. Over $75,000 has been lost in attempting to operate the mill there on a poor site with bad management.

—A "labor" journal here is set on a typesetting machine. The MINING AND SCIENTIFIC PRESS is one of the few papers in this city that employs men to set the type for the paper, machines having in most cases taken their place.

—The machinery in the old Pioneer Woolen Mills at North Beach, this city, was bought by Japanese, who will set it up in Japan to make woolen cloth. Still, there are probably coast wool growers who will vote a free trade ticket again.

—American manufacturers and merchants doing business in Mexico are notified of the abolition of the interstate duties in that country. It is expected that the inauguration of the new system will be followed by an increase in the shipments of American goods to various parts of Mexico.

—The close margin now existing in the way of corporate profits is exemplified by the annual report of the San Francisco and North Pacific Coast Railway, which, under good management and comparatively fair business, was only able to show a profit of .26 of 1 per cent on the capital stock for the year ending June 30, '95. A mine superintendent that couldn't make a better showing than that would be in danger of being "fired."

—The Placerville *Democrat* states that a surveying party from Folsom have left Placerville for the Summit, with work before them for the summer. In the interest of the Natoma Water Company and the American River Land & Lumber Company, the party is to locate sites for storage reservoirs and to make accurate surveys of lakes and their outlets, of streams and all sources of water supply for lumbering, transportation, milling and mining purposes.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JULY 21, 1896.

564,331.—FRUIT DIPPER, ETC.—F. Kimble, Los Angeles, Cal.
564,251.—PIPE PATCH—T. F. Long, Garvanza, Cal.
564,452.—KEY FASTENER—F. Reisner, Eugene, Or.
564,336.—BUGGY TOP ADJUSTER—J. G. Ritz, Newberg, Or.
564,314.—ANNUNCIATOR—J. B. Rogers, Zillah, Wash.
564,341.—HYDROCARON—F. Salanthe, Santa Paula.
564,580.—PAPER FILE—A. J. Thompson, S. F. Cal.
564,349.—LAWN SPRINKLER—J. P. Van Sickle, Pasadena, Cal.
564,463.—CUSPIDOR—Wolf, Johnson and Wallace, Winslow, Ariz.
35,797.—DESIGN FOR CURTAIN RING—W. P. Bower, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Fourth on the List.

In the last volume of the MINING AND SCIENTIFIC PRESS, the twenty-six numbers from January to June of this year, inclusive, the mines of Siskiyou county received thirty-two notices, varying in length from six lines to a column. Amador and Nevada counties each received thirty-eight and Calaveras forty-three. This puts Siskiyou county fourth on the list—the same position in which we appear as a gold producer.—Yreka Journal, July 28th.

Personal.

WM. WILLOUGHBY has returned to Grass Valley from South Africa.

JOHN TRUSCOTT is the new superintendent of the Oneida mine, Amador Co.

SUPT. HANSBOROUGH of the Rising Sun mine, Sierra City, Cal., will shortly resume work.

THOS. OXAM has assumed general management of the Jim Crow and Monitor mines, De Lamar, Nev.

E. H. AIRIS succeeds Col. J. W. Donnellan in the presidency of the Salt Lake, Utah, Mining Exchange.

THE Boston and Montana officials deny the Eastern report that Capt. Couch had resigned as general manager.

JAS. SHIRLEY has taken charge of the Yum Yum and Annie mines at Big Bug, Arizona, and will build a new mill.

E. K. STEVENOT, M. E., has gone to Calaveras and El Dorado counties to examine and report on some mining properties.

CHAS. D. LANE, the wealthy California miner, paid all the indebtedness of the Bimetallic National Committee at St. Louis.

E. B. PRESTON, of the State Mining Bureau, is in Nevada Co. W. H. Storms, who recently returned from Placer Co., goes to Calaveras.

"BARBARIAN" BROWN, of the Cœur d'Alenes, has returned from South Africa, where he took part in the recent political troubles.

JOS. T. GOODMAN, well known to many old Nevadans, has built a house at Mariposa, where he is finishing his book on Central American hieroglyphics.

W. E. SUTTON has been appointed superintendent of the mines at Monte Cristo, Wash. Mr. Sutton was for several years chief engineer of the Mollie Gibson mine at Aspen, Colorado.

ENGINEER GRIFFITHS of the S. P. Co. goes to Guatemala to superintend the construction of forty miles extension of the Occidental Railroad from Champerico on the Guatemalan coast to San Felipe, as far as Mazaltenango. The mountainous character of the country will make the work cost nearly $3,000,000.

R. L. DUNN left last Wednesday for Siberia, via Paris, to examine and report on a placer mining undertaking on the Amoor river. He contemplates an absence of four months. It is understood that Mr. Dunn receives one of the largest fees ever paid an American mining engineer for similar services.

Recent California Mining Incorporations.

Blaine G. M. Co., by E. N. Linsay, E. B. Young, A. D. Bowley, C. Ospin, J. Moore, San Francisco; capital stock, $200,000—$13,231 paid up.

Hartman M. Co., by J. H. Wallace, H. J. Small, H. L. Stevenson, G. W. Peer, J. Musgrove, San Francisco; capital stock, $60,000—$26,500 paid up.

Victoria G. M. Co.; capital stock, $500,000; E. S. Smith holds $499,900 worth of stock, W. A. McNaughton, E. W. Huford, M. T. Dusinbury, W. R. Thomas, Oakland.

Recently Declared Mining Dividends.

THE Boston & Montana Co. will pay a $3 dividend on the 20th inst.

UNITARIAN LITERATURE sent free on application. Address Postoffice Mission Committee, First Unitarian Church, corner Geary and Franklin streets, San Francisco. Mention this paper.

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MONEY LOANED ON BONA-FIDE MINES.

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.
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Assay and Chemical Work Done on Reasonable Terms.
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TO MINE OWNERS AND SUPERINTENDENTS.

Gentlemen:

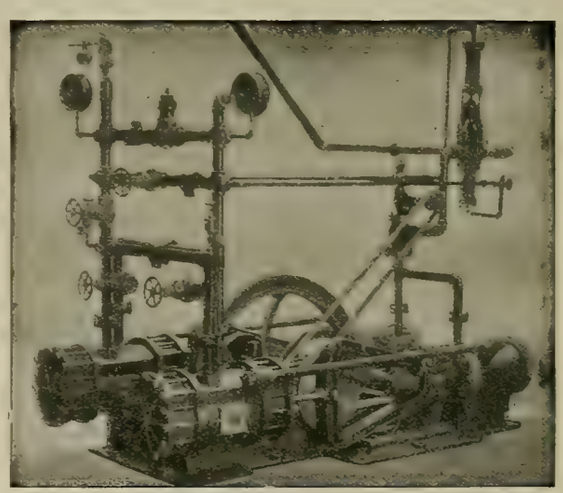
We desire to express to you our appreciation of the 12 H.P. Power Gasoline Hoist, purchased by us for our works at Silver City, Utah. The same is working satisfactorily to our Board of Directors. We have never yet used in any one day, five gallons of gasoline ~~for~~ to do our hoisting, although we are running two shifts of men, one at night and one in the day, using the engine during the day only. We are satisfied that in a dry country, or in one where fuel must be transported any considerable distance, that the gasoline hoist is the proper one to purchase; for that matter, we may say, even where water and fuel is plenty, after a thorough test of the Hercules Gasoline Engine, we would not consent to the erection of any other plant, as it costs less than three-fourths of a cent per ton hoisting one hundred and sixty-five feet high. We therefore take pleasure in recommending the Hercules Gasoline Engine as being the most complete and successful hoisting engine of that kind in the market.

Very respectfully,
Fond Aces Mining Company
By Brant & Booth
President.
By. J. R. Slater
Secretary.

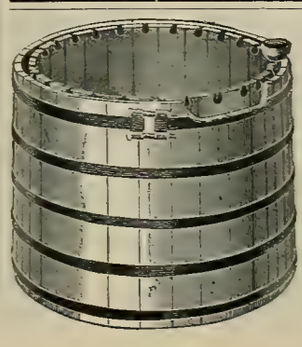
Fac simile of letter to

HERCULES GAS ENGINE CO., builders of Gas, Gasoline and Crude Oil Engines, from 1 to 200-horse power. Hoisting, Pumping, Stationary and Marine. Office, 405 and 407 Sansome Street, San Francisco, Cal.

DOUBLE PIPE AIR COMPRESSOR.



This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to PNEUMATIC POWER CO., at 306 Pine St., San Francisco, Cal. We could save you money, though, in cost of foundations, as our Compressors are half the size of other makes.



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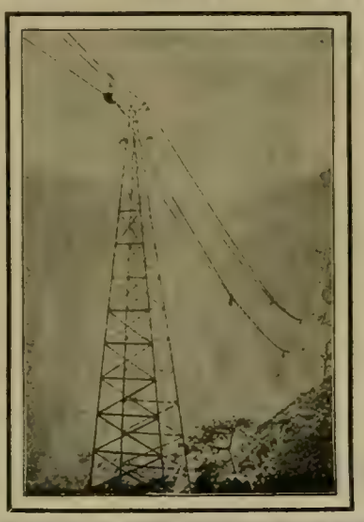

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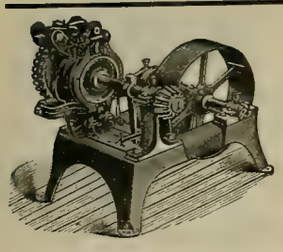

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For information concerning this process for the reduction of ores containing precious metals, and terms of license, apply to

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To MINE OWNERS and others having Refractory Gold and Silver Ores hitherto untreatable at a profit, the MACARTHUR-FORREST (Patent) Process of Gold and Silver Extraction offers a solution of the difficulty.

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The Kendall Process is the most efficient method of using cyanide for the extraction of precious metals from their ores. Wherever this process has been adopted the result has been increased percentages of values recovered and saving of time. Material reduction in consumption of chemical has also been demonstrated with respect to several classes of ores.

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Capt. De Lamar has adopted the process at his Nevada mines, where a 250-ton plant is being completed. He writes that he is saving 95 per cent of his gold values, and regards the Kendall Process as the cheapest and best he is aware of for the treatment of gold ores.

All ores, without exception, amenable to cyanide treatment can be treated to better advantage by the Kendall Process. This can be accepted as an axiom.

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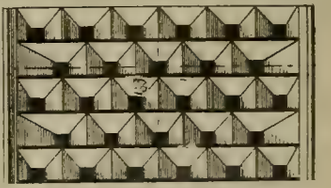

This Riffle is just what placer miners want whether they are working large or small claims, as it is the only riffle ever invented that holds the mercury entirely exposed to the material, no matter what force of water is used. A large number of these Riffles have been sold, and are now in use in Colorado, Montana, New Mexico and elsewhere, and the first complaint has yet to be made against them. Many testimonials have been received from parties who have used and are now using them, giving them the highest praise. Are made of chilled cast iron, cheaper and more durable than any other process. Agents wanted. County and State rights for sale. These Riffles are manufactured at Denver only. Address all orders and communications to

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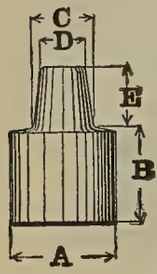

A=.....inches.
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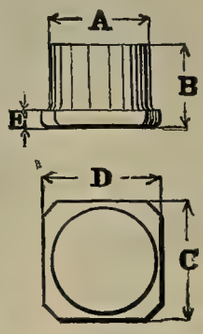
These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



A=.....inches.
B=..... "
C=..... "
D=..... "
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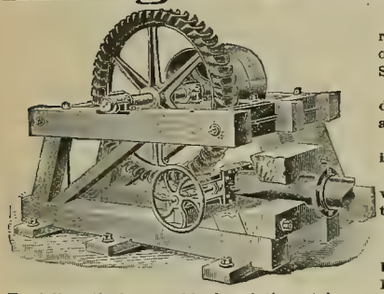

The accompanying cut shows the general arrangement of Knight's Standard Water Wheel, of which there are hundreds in use in different States of the Union.

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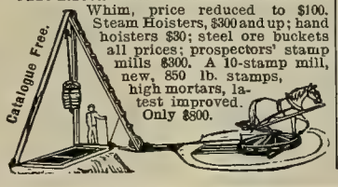

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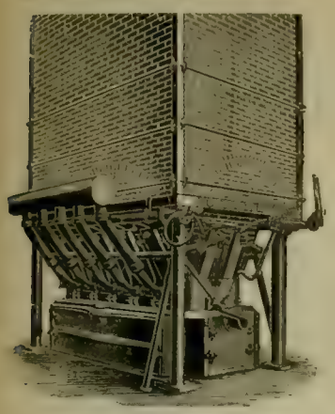

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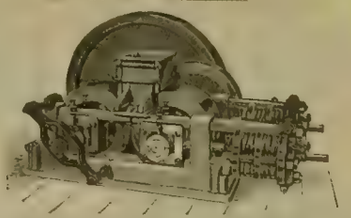

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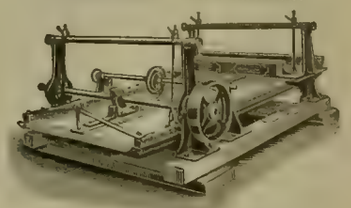

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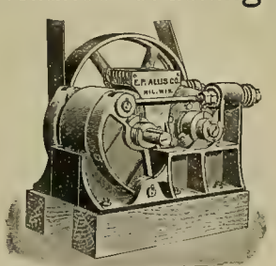

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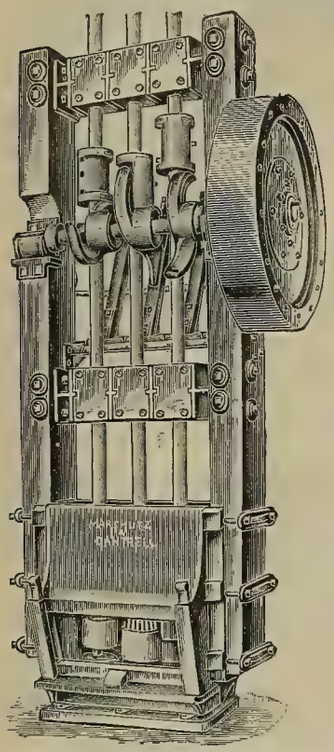

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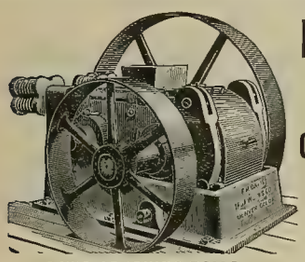

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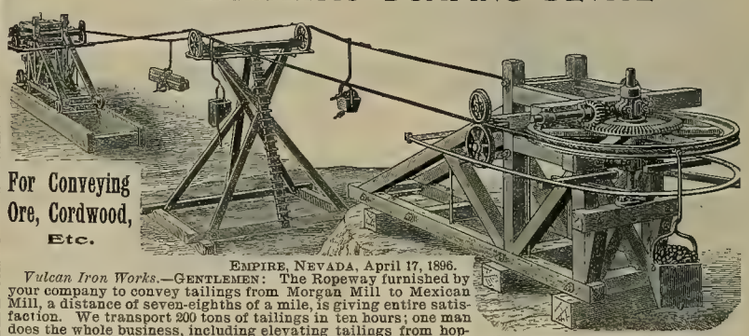

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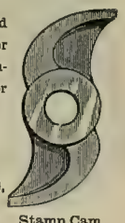

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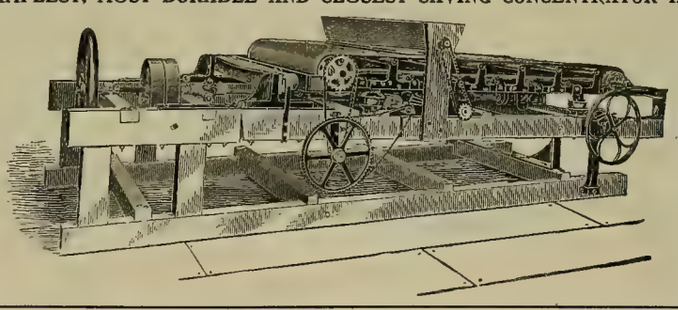
CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



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Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
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was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891.

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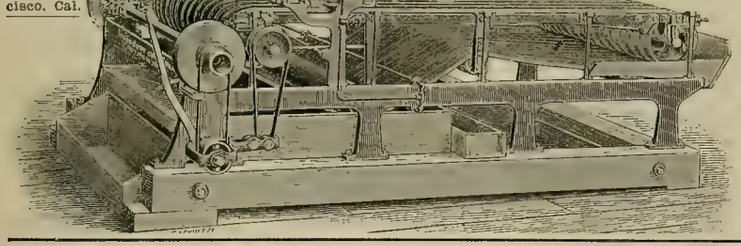

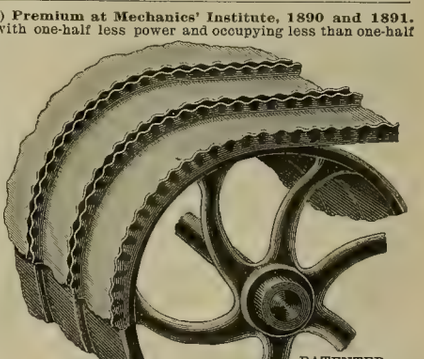

PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st prize at the World's Columbian Exposition, 1893, and at the San Francisco Midwinter Fair, 1895.

THE GUTTA PERCHA AND RUBBER M'F'G CO.

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Spadone's Concentrator Belts. Patented.

The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

FIG. 1.

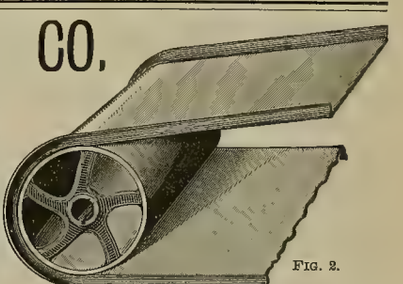

FIG. 2.

We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.

THE GUTTA PERCHA RUBBER AND M'F'G CO.
TELEPHONE, MAIN 1813.

Market Reports.

The Markets.

SAN FRANCISCO, July 30, 1896.

General trade continues good for the season of the year. The buying, as a rule, seems to be confined to as small quantities as possible, but ordering is oftener so as to keep up assortments. It is stated by returning traveling salesmen that the feeling throughout the coast is more hopeful, and where two years ago pessimists were in the majority they now find the optimists in the majority. Even in agricultural districts this feeling has changed for the better. Prices for grain, fruits and other farm products average higher than at this time last year, while inland transportation charges average less. Taking the price of wheat alone, and the advance over that ruling a year ago makes a difference in favor of the farmer of fully $1,000,000, while the present outlook points to still better figures before the end of November. This is an important factor with the trade and one which will make itself favorably felt later on. In the lumbering camps there is continued activity, while in the mining districts there was never before such activity. It is estimated that there are fully 30,000 more men engaged in mining, prospecting, etc., than two years ago, and still the number steadily increases. This naturally makes more business with foundrymen, machinemen and others engaged in ironworking. The improved prospects for cereals will naturally have a favorable effect on farm implements, and therefore it is only reasonable to assert that the coming winter and next spring agricultural implement makers will have a large increase in orders, which will call for more help and a freer distribution of money.

In the local money market there is nothing new to report. So far as can be learned, the silver agitation has had no unfavorable effect, and none is looked for by persons outside of chronic croakers who invariably see financial crises ahead. The disbursements made this month for dividends, interest and regular semi-annual and annual settlements are going into circulation again. The inquiry for funds is light from both legitimate and speculative sources.

New York Silver Prices.

NEW YORK, July 30.—Following are the closing prices for the week:

	Silver in—	
	London.	N. Y.
Friday	31⅜	68⅝
Saturday	31⅜	68⅝
Monday	31⅜	68⅝
Tuesday	31 7-16	68¾
Wednesday	31 7-16	68¾
Thursday	31⅜	68⅝

	Copper.	Lead.	Iron.	Tin.
Friday	11 25	2 90	10 50@12 50	13 40
Saturday	11 00	2 90	10 50@12 50	13 40
Monday	11 00	2 90	10 25@12 50	13 40
Tuesday	11 00	2 85	10 25@12 50	13 40
Wednesday	11 00	2 85	10 25@12 50	13 40

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	.5
New York Telegraphic Transfer	7½
London Bankers' 60 days	$4.88
London Merchants	$4.86½
London Sight Bankers	$4.89¾
Refined Silver, per oz., 1000 fine	68⅝
Mexican Dollars	54@55c

SILVER.—The market has been quiet, both on this coast and at the East, for export, but there has been more buying for speculation, which keeps prices fairly steady. The speculative buying seems to be founded on the belief that, under silver agitation, prices will advance by reason of large producers not offering freely, and with light obtainable supplies the usual foreign demand will send prices up. So far as we are able to learn, the outturn of silver in this country this year will not be more than from 5 to 10 per cent more than that of 1895. In this city quite a number of persons have bought silver in quantities varying from 5000 ounces up.

Recent silver shipments from New York were as follows:

S. S. Campania, July 18, 620,000 ozs.

(J. & W. Seligman & Co. 250,000, Handy & Harman 125,000, Zimmermann & Forshay 125,000 and M. Guggenheim's Sons 120,000 ounces.)

S. S. St. Paul, July 22, 320,000 ozs.

(J. &W. Seligman & Co. 155,000, M. Guggenheim's Sons 115,000 and Fuller & Wilson 50,000 ounces.)

S. S. Fuerst Bismarck, July 23, 125,000 ozs.

(Handy & Harman 50,000, Zimmermann & Forshay 50,000, Muller, Schall & Co. 25,000 ounces.)

S. S. Fuerst Bismarck, July 23, $2,000,000.

(Kuhn, Loeb & Co. $500,000 bars, Heidelback, Ickelheimer & Co. $250,000 bars, Von Hoffmann & Co. $500,000 coin, Kuhn, Loeb & Co. $250,000 gold coin and Lazard Freres $500,000.)

S. S. Trave, July 21, 155,000 ozs.

(Zimmermann & Frosbay 75,000, Handy & Harman 55,000 and Muller, Schall & Co. 25,000 ounces.

MEXICAN DOLLARS.—There is very little doing in an export way. The light call is, so far, a disappointment.

COPPER.—The market is weak at the East under moderate demand. While the market is easy, yet it is said that considerable confidence is expressed in future values. This feeling is founded on confirmed advices that the consumption abroad is still on a large scale, which makes a steady inroad into stocks, notwithstanding the free shipments. The production in this country under improved methods of mining and reduction shows quite a gain over two years ago.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The call for shipment to the west coast of Mexico does not show any falling off; from other points the demand is light to fair.

The market is quoted as follows:

Home trade, per flask	37 00
Distant points up north	36 25@37 00
West coast of Mexico, for export	34 50

ANTIMONY.—The demand is slow, with the market easy at 7¾@8⅛c in a jobbing way. New York mail advices quote 7¾@7⅞c for Cookson's, 6¾c for Hallett's and 6½c for Japanese, from store.

LEAD.—There is nothing new to report. The demand is light. The East reports a weak market, with supplies liberal and demand only fair.

Pig	3 75	@	4 00
Bar	—	@	4 15
Sheet	—	@	5 50
Pipe	—	@	4 75

SHOT.—The market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—The market is essentially unchanged. The demand is light.

Pig, per lb	14⅛c
Plate, I C coke, heavy, per box	$4 25
" " " light, "	4 10

BORAX.—The market is quoted as follows

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	6⅛
Concentrated, "	5⅝

POWDER.—Tere is a continued large demand from the mining districts.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

IRON.—There is a continued free consumption with us. The market is firm at unchanged quotations.

Our market is quoted as follows:

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 50
Gartsherrie	21 50	23 50

Bolt.....¼ & 5-16, 20c; ⅜ and larger, 17c

Lake Superior Sheathing..... 20

COAL.—The consumption of steam is increasing, but the spot supplies and shipments are ample to meet all requirements, which keep the market steady.

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 00@ 5 50
Coos Bay	—@ 4 50
Cannel	—@ 8 50
Egg, hard	—@11 50
Wallsend	—@ 7 00
Scotch Splint	—@ 7 50
Brymbo	—@ 7 50

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—There is nothing new to report.

The market is quoted in this city from dock or yards as follows:

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is quiet, with the call confined to nearby wants.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, July 30, 1896.

The market has been fairly active, with Chollar and Potosi the leaders. If signs do not fail it looks very much as if stronger moneyed parties are manipulating. While this seems to be the case, yet, even conceding it to be so, outside operators must not run away with the idea that prices will go right up, for, taking all preceding upmoves as a guide, there have been decided setbacks if not breaks in prices before the market got into shape for proper handling. In view of the way in which manipulation has been done, it should not cause surprise if the leaders, Chollar and Potosi, were badly cut at any time; indeed, in usually well-informed circles, there are reports that lower prices must be looked for before any decided upmove sets in. Whether these reports will prove correct the writer has no way of verifying. So far as the mines are concerned, they are in better condition than the fore part of June, when prices were from 100 to 150 per cent higher than ruled on Call yesterday when Chollar sold at $2.30. Taking the Brunswick lode we find that on the 300-foot level of Chollar, Hale & Norcross, Savage and Gould & Curry the work has been well advanced and that every indication gives encouragement to the belief that more ore will be found than was on the 200-foot level. While active work is under way on the 300-foot level, they will be soon in position to exploit the 400-foot level. In Occidental the work under way is of a very important character. At several points on the Comstock lode the work that is being done deserves close watching, for it points with unerring certainty to much better things than have obtained for many a long month. Yet, to freeze outside holders out of their shares, the market may be manipulated down, assessments put on and everything made to look "rotten" and discouraging. To a certain extent this is being done even now. About seven weeks ago nothing too good could be said of the outlook of the mines on the Comstock and Brunswick lodes; then prices were high and the manipulators wanted buyers; now the mines have only a few friends, while the situation is made to look as bad as possible so as to discourage outsiders and have them sell at the low current prices.

Herman Zadig returned last Tuesday from a trip to the Comstock and Brunswick lodes. He had in his company two mining men who are reported as being convinced that the Brunswick lode will prove to be richer than given credit. Mr. Zadig deserves credit for the untiring interest displayed in trying to build up in the face of strong opposition the mining industry at Virginia City, which would benefit suffering shareholders in the different mines on the Comstock and Brunswick lodes.

News from the Comstock mines begins to grow in interest as work progresses in the different groups. Yet this work can be stopped or turned in a wrong direction any day and outside shareholders be made to suffer. In Alta they are in better formation and ore giving fair assays. Overman, Seg. Belcher and Belcher are raising some ore each week while doing exploiting work. In Crown Point the work is continued on several levels. They ought to be soon in position for extracting ore. On the 1100-foot level some ore is to be extracted for the purpose of testing. It is stated that this will be done by a new process at some other place than Virginia City. Work is to be resumed in Kentuck before long. We are not advised as to the work, if there is any, that is being done in Yellow Jacket. In Confidence they are still raising for air connection. When this is secured, work in that mine and Challenge will be resumed, and more energetically, too. In Con. Imperial the joint Confidence, Challenge and Con. Imperial crossdrift is being pushed ahead. It is in about 625 feet and should be near the west lode. Work is also continued in crossdrift No. 2 in the same mine. In Alpha they are still at work on the 500-foot level. Work is continued on the long west crossdrift in Bullion. In Potosi and Challenge they are working on the same levels heretofore reported. Over 100 tons of $23-ore was raised last week by Chollar. The work in both Savage and Hale & Norcross is being closely watched. It is on the levels heretofore reported. The joint east crossdrift of Gould & Curry and Best & Belcher is being driven ahead. In Con. Virginia the work is practically unchanged. When the south drift on the 1650-foot level reaches the Best & Belcher line, that level will be exploited. They raised over 130 tons of ore the past week, which assayed over $50 a ton. The company is paying expenses. On the 1000-foot level the formation is favorable, but the ore encountered is more or less barren. The work in Ophir, Mexican, Union, Sierra Nevada, Utah and Andes is on the same levels heretofore reported, with no particular change to note.

The Brunswick lode continues the attraction. Every mining man that has visited it and given the work done close personal inspection is outspoken in the belief that a large body of ore will yet be found, while the ore already found will pay to extract and mill after the lode is better developed. These opinions make men who do not gamble for small things hold their shares of the mines located there for something big or else for a small loss to them. In Occidental work has been commenced in sinking a winze from the 750-foot level, while exploiting work is continued on the other levels. There is a report of an improvement in the mine. In Chollar they will start two or three crosscuts on the 300-foot level sometime in next week. It ought not to take more than three days after starting the work before the downward continuation of the ore found above is struck. This, it is believed, will give new life to the lode. In Hale & Norcross they are pushing work on the 300-foot level while sinking the winze to the 400-foot level. When this depth, which will be in about ten days, is secured that level will be exploited. In Gould & Curry the work is being closely watched and good results confidently predicted by mining men.

The market opened this morning fairly active at an advance of from 10 to 25 per cent over last night's closing. The upmove was due to reports of an improvement in the Chollar 300-foot south drift. At the higher prices some of the short sellers are said to have filled. The general public seem to be feverish and afraid to operate owing to their being skeptical of any stability to the market. It is said that there was considerable realizing at the advance. It is stated that the improvement in Occidental was in the 750-foot south drift. The market was lower at the 2.30 P. M. session. Confidence has been assessed 30 cents a share.

The following illustrates the changes of the week:

Mines.	July 23.	July 30.
Alpha	$ 15	$ 15
Alta Consolidated	08	....
Andes	27	31
Belcher	40	40
Best & Belcher	53	60
Bodie	60	....
Bullion	17	21
Challenge	47	50
Chollar	1 85	2 85
Confidence	1 10	1 15
Consolidated California and Virginia	1 60	1 80
Consolidated New York	03	....
Crown Point	40	40
Exchequer	....	05
Gould & Curry	64	78
Hale & Norcross	1 10	1 35
Justice	....	....
Mexican	55	60
Ophir	94	....
Overman	20	....
Potosi	94	1 40
Savage	64	78
Sierra Nevada	54	....
Union	....	48
Utah	....	11
Yellow Jacket	39	43

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Anita G M Co, Cal	10	7c	July 20	Aug 25. Sept 15	L F Reichling, 404 Montgomery
Best & Belcher M Co, Nev	60	25c	July 2	Aug 6. Aug 27	M Jaffe, 309 Montgomery
Bullion Con G M Co, Cal	8	15c	June 16	July 20. Aug 11	C A Grow, Mills Building
Channel Bend M Co, Cal	3	5c	June 23	July 31. Aug 23	J P Langhorne, 39 Sutter
Chollar M Co, Nev	42	25c	June 9	July 14. Aug 4	C E Elliot, 309 Montgomery
Confidence S M Co, Nev	27	30c	July 30	Sept 3. Sept 24	A S Groth, 414 California
Con Imperial M Co, Nev	37	1c	July 24	Aug 27. Sept 22	C L McCoy, Mills Building
Gold Bar Con M Co, Cal	4	2c	July 13	Aug 20. Sept 21	E C Godfrey, Crocker Bldg
Jamison M Co, Cal	8	5c	July 6	Aug 15. Aug 31	Sam W Cheyney, 120 Sutter
Kentuck Con, Nev	12	5c	June 16	July 22. Aug 12	Aug Waterman, 309 Montgomery
Marguerite G M & M Co, Cal	3	10c	June 18	July 28. Aug 28	Chas. Winters, 237 Twelfth
Nimshew G M Co, Cal	1	3c	June 5	July 13. Aug 3.	C D Cook, Mission St Pier No. 1

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
North Pacific Mining & Transportation Co.	E D Farish, 632 Market	Aug 17

San Francisco Stock Board Sales.

SAN FRANCISCO, July 30, 1896.

9:30 A. M. SESSION.

1300 Alpha	15	1500 Exchequer	05
100 Andes	31	800 Gould & Curry	78
100 Belcher	38	600 H. & N	1 35
300	39	300 Mexican	58
300 Bullion	20	300	60
500	21	400 Occidental	59
200 Caledonia	13	100	58
2000 Chollar	2 80	700 Potosi	1 35
250	2 85	50	1 40
50	2 75	300 Savage	78
500 Challenge	49	50 Union	47
100	50	200 Utah	11
10 Con Cal & Va	1 65	800 Yellow Jacket	43
2000 Con Imperial	02	200	42
2000 Crown Point	40		

SECOND SESSION—2:30 P. M.

100 Mexican	60	200 Yellow Jacket	43
200 Gould & Curry	72	300	42
650 Best & Belcher	60	200 Belcher	40
100	59	100	39
500 Con Cal & Va	1 80	200 Union	48
500 Savage	74	50 Confidence	1 10
200	72	100	1 15
100	73	300 Exchequer	05
300 Bullion	20	200 Challenge	49
700 Chollar	2 55	50	50
400	2 50	100 Occidental	60
300 Potosi	1 25	50	63
400 H. & N	1 25		

"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colo.

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Properties located in the Cripple Creek Gold Mining District.

We believe we can give you the largest prospective value for the least money.

Investigate carefully; hesitate before buying other stocks; consider SANTA ROSA and know why you don't want it.

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Amalgamator, Assayer and Bookkeeper

Desires position at mine. Several years practical experience. Good references. Address

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REMOVAL NOTICE!

We take pleasure in notifying our friends and patrons that upon AUGUST 15th we shall remove from our present quarters to

409 MARKET STREET, Between Fremont and First,

Where, on account of our more central location and more commodious quarters, we shall be better able to look after the interests of our customers.
We thank you for your past favors and solicit your future patronage.

CALIFORNIA ELECTRICAL WORKS,
F. A. GREENWOOD, Secretary.
Remember the New Address—409 MARKET STREET, After August 15th.

Westinghouse Electric and Manufacturing Company,
PITTSBURG, PA.

The Most Modern Mining Equipment
—Is the—
Tesla Polyphase Alternating System of Electrical Transmission.

Current for MINING LOCOMOTIVES, INCANDESCENT LIGHTS, ARC LIGHTS and POWER supplied from THE SAME CIRCUITS.

NEW YORK, 120 Broadway.
BOSTON, Exchange Building.
CHICAGO, New York Life Building.
TACOMA, WASH., 102 S. 10th Street.

PITTSBURG, Westinghouse Building.
BUFFALO, Erie County Bank Building.
PHILADELPHIA, Girard Building.
ST. LOUIS, American Central Building.

CHARLOTTE, N. C., 36-38 College St.
SYRACUSE, N. Y., Bastable Building.
SAN FRANCISCO, Mills Building.
WASHINGTON, D. C., 1333 F. St. N.

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One 25 H. P. Ohmn Engine;
One 40 H. P. Tubular Boiler.

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35 Market St , San Francisco, Cal.

Assessment Notices.

BEST AND BELCHER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey county, Nevada

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of July, 1896, an assessment (No. 60) of twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 33, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of August, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 27th day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
M. JAFFE, Secretary.
Office—Room No. 33, Nevada block, No. 309 Montgomery street, San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Little Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 8) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 31st day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
SAM W. CHEYNEY, Secretary.
Office—Room 50, 120 Sutter street, San Francisco, California.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of July, 1896, an assessment (No. 4) of Two cents (2c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 38, Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of August, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 21st day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
E. C. GODFREY, Secretary.
Office, Room 38, Crocker Building, San Francisco, alifornia.

CONSOLIDATED IMPERIAL MINING COMPANY. Location of principal place of business San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors held on the 24th day of July, 1896, an assessment (No. 37) of One (1c) Cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 35, third floor Mills Building, corner of Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 27th day of August, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on TUESDAY, the 22d day of September, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
C. L. McCOY, Secretary.
Office—Room 35, Third Floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

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CAVEATS, TRADE MARKS.
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220 MARKET ST. S.F.

DELINQUENT SALE NOTICE.

NIMSHEW GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Nimshew, Butte County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the Fifth (5th) day of June, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
D. Gutman, Trustee	19	500	15 00
D. Gutman, Trustee	20	500	15 00
D. Gutman, Trustee	21	500	15 00
D. Gutman, Trustee	22	250	7 50
D. Gutman, Trustee	23	250	7 50
D. Gutman, Trustee	24	250	7 50
D. Gutman, Trustee	25	250	7 50
D. Gutman, Trustee	26	500	15 00
D. Gutman, Trustee	37	500	15 00
D. Gutman, Trustee	38	500	15 00
D. Gutman, Trustee	53	200	6 00
D. Gutman, Trustee	54	200	6 00
Geo. C. Higgins, Trustee	12	200	6 00
Geo. C. Higgins, Trustee	13	200	6 00
Geo. C. Higgins, Trustee	14	200	6 00
Geo. C. Higgins, Trustee	15	200	6 00
Geo. C Higgins, Trustee	16	200	6 00
Geo. C. Higgins, Trustee	74	10,000	300 00
T. F. Boyle	32	500	15 00
M. Olsen	35	1,000	30 00
M. Olsen	148	1,000	30 00
M. Olsen	149	4 000	120 00
J. M. Fletcher	34	250	7 50
T. Thomson	72	1,000	30 00
T. Thomson	73	1,000	30 00
T. Thomson	135	500	15 00
C. M. Martin	66	500	15 00
C. M. Martin	67	500	15 00
C. M. Martin	68	500	15 00
C. M. Martin	69	500	15 00
S. Gerthrude Symth	70	5,000	150 00
Wm. Matson	122	2,000	60 00
Wm. Matson	142	5,000	150 00

And in accordance with law, and an order from the Board of Directors, made on the 5th day of June, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Mission Street Pier No. 1, San Francisco, California, on MONDAY, the 3rd day of August, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale. C. D. COOK, Secretary.

Office, Pier 1, Mission Street, San Francisco, California.

ANNUAL MEETING—The regular Annual Meeting of the stockholders of the North Pacific Mining and Transportation Company will be held at the office of the Company room 5, No. 632 Market St., San Francisco, California, on Monday, the seventeenth (17th) day of August, 1896, at the hour of 1 o'clock p. m., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Wednesday, August 12th, at 3 o'clock p. m.

E. D. FARISH, Secretary.
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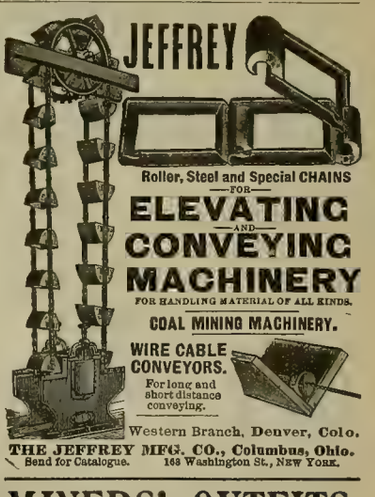

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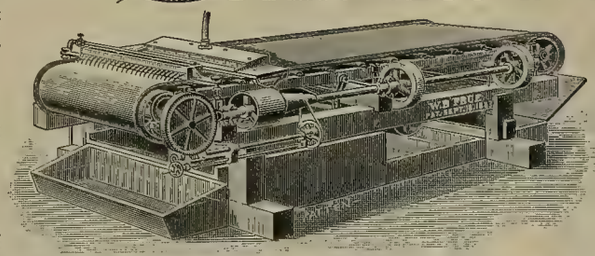

It can be safely stated, without going into a description of several new and untried concentrators that have lately come into the market, that where sulphurets are of such value as to make close saving necessary, the Frue Vanner is always used. It is the only endless belt concentrator in the market that can be relied on to handle all classes of ores, and give universal satisfaction. (In all competition of concentrators the Frue Vanner is taken as the standard machine of the world and all comparisons made by it. There have been over 4200 of these machines sold, 1700 having been sold on the Pacific coast alone.) They are in use in every part of the world where mining is carried on and in all cases they are giving perfect satisfaction. From time to time valuable and important improvements have been made in this machine to increase its capacity and durability, and particular attention is called to the Patent Lip Flange for the rubber belt, which does away with nearly all the strain and cracking, as in the old style of flange, making the life of belt more than double that of other style belts in the market. The lip of flange bends outward in going over the large end rolls, thereby distributing the strain in the solid rubber, and bringing virtually no strain either at the edge or at the base of flange, as is the case in all belts with a raised edge.

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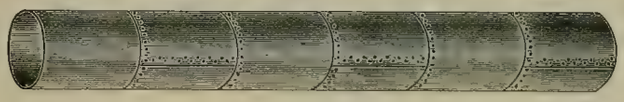

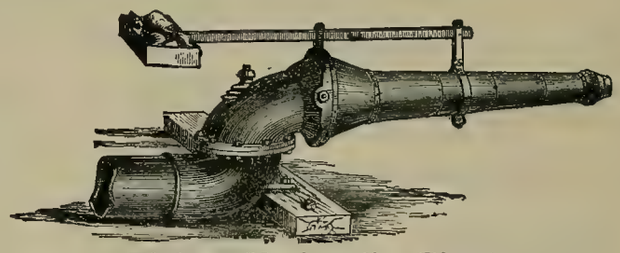

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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1883.—VOLUME LXXIII. Number 6. SAN FRANCISCO, SATURDAY, AUGUST 8, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

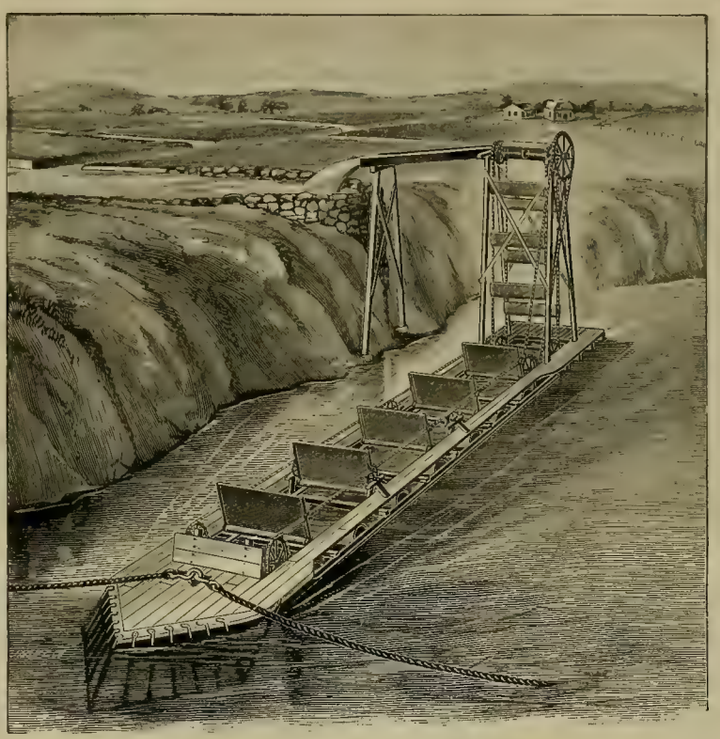
A New Amalgamator.

The fact that a large proportion of free gold and silver is lost during milling operations when such metals exist in the ore in a fine state of division is perhaps too well known to need mention. Much time, thought, labor and means have been devoted to investigating the causes of this heavy loss, and the ingenuity of mill men has been taxed to the utmost to devise methods for its perfection.

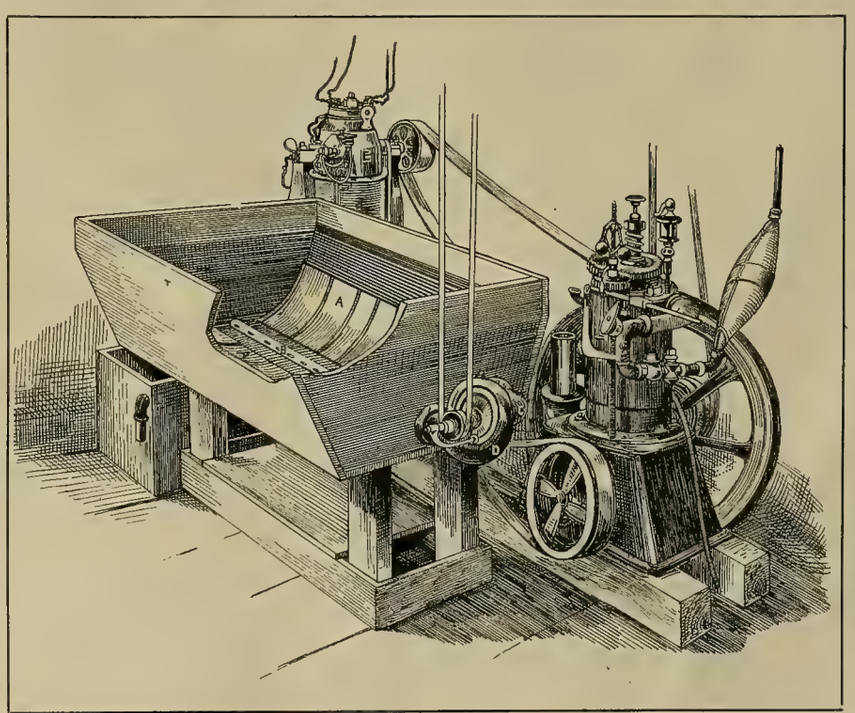
Since pure gold and silver present no difficulty in amalgamation, the failure to extract full values from the ores described must be attributed to the mechanical rather than chemical difficulties in the process of reduction. Under the usual system the auriferous pulp is carried from the battery by a stream of water over amalgamated plates set in the mortar, on the apron, and in the sluices, and it is assumed that the precious metals will be deposited upon these plates by the action of gravity, since the specific gravity of gold to water is as 19.3 to 1. But under some conditions this high specific gravity is not sufficient to insure success. In spite of care and constant vigilance constant losses occur in mills where ores assaying high work low, owing to the extreme fineness of values contained.

Many plans have been devised to save this fine gold and silver, one of the most successful being the system of arranging the plates in a series of steps or drops, where the stream of water and pulp are broken by a vertical fall of several inches. A good many amalgamating machines are in the market, in a greater or less degree working on the specific gravity principle. A departure from that method is designed in a new amalgamator, herewith illustrated, made by some San Francisco men, whose office is room 214 Safe Deposit building, this city.

The machine consists of a rectangular tank (T), having its bottom so constructed as to form curves on both sides of the center. Upon these curves the amalgamated plates (A) are set. They are designed to produce a deflection of the currents issuing from the side of a pipe (B) placed upon the bottom and longitudinally in the center of the tank. The pipe is perforated on each side by slots arranged in a line near the bottom. A short pipe (C) enters the tank at one end, placed above the first one mentioned, and so situated that it will always be covered by the charge. This pipe is open and serves for suction or intake. A centrifugal pump (D) connects the two pipes. For treating refractory ores electrodes, connected with a dynamo (E), are used in the tank. When the tank has been filled to the proper depth by the charge of pulp and water the pump is set in motion. The mass, being drawn into the short pipe, passes through the pump to the lower pipe, and is there impelled through the slots against the curved surfaces by the action of the pump. Deflected by these curves, the currents pass to the top and are there deflected inward. The pulp accompanies the water as it is impelled against the plates, and, according to the idea of the inventor, the precious metals contained therein are instantly caught and held by the amalgamated surfaces. This action is repeated until the pulp is exhausted of its values and the charge is renewed.



A NEW CURRENT MOTOR.



A NEW AMALGAMATOR.

A New Current Motor.

The term "current motor" is applied to a mechanism that utilizes the power of the stream or current of a river in such a way that it can be applied to run machinery.

A current motor, it is claimed, can be used without a dam in any location in a river where the water is deep enough to admit it. There is almost no limit, the manufacturers claim, to the use to which the power generated by a current motor can be applied. For example, it may be used for generating electricity for electric lighting purposes, but its chief use will be in connection with irrigation and mining.

The motor herewith illustrated has been experimented with and tested and its practicability is fully believed in by its makers, the F. C. Austin Manufacturing Co. of Chicago, who claim that the only limit to its power and amount of water that can be pumped is the dimensions of the paddles, the number of them and the force of the current. The machine, which is represented as anchored in the river, consists of a pontoon carrying two endless chains, to which are pivotally attached at suitable distances reversible paddles, having floats at their upper ends that buoy them up in their course through the water. These paddles enter and leave the water in such a way as not to detract from the efficiency of the machinery, but calculated to rather add to it. To the wheels put in motion by these cables is attached an elevator carrying large buckets, which when entering the water to fill themselves, it is claimed, add to the generation of power and are so arranged that when they reach the top of the elevator they discharge their contents with little friction into a trough, there to be conveyed to the shore, where a reservoir has been constructed to collect the water and distribute it through canals and lateral ditches.

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J. F. HALLORAN.....General Manager

San Francisco, August 8, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—A New Current Motor; A New Amalgamator, 105. Hon. Tirey L. Ford, 110.

EDITORIAL.—A New Amalgamator; A New Current Motor, 105. American Manufacturers in Brazil; Methods for the Preparation of Timber for Underground Use; The Recent Appropriation by Congress; "Suspension of Assessment Law;" Narrower Gauge; Liquid Air Considered Commercially, 106.

SCIENTIFIC PROGRESS.—Compressed Air for Street Cars; November Meteors; Explosions in Mines; Curious Colors of Aluminum Alloys; A Pendulum Instrument; An Aluminum Quadrant Devised, 112.

MECHANICAL PROGRESS.—The Power Plant at the Corral Hollow Coal Mines; A New Boat; Casting German Silver; Gold Not the Highest Metallic Standard; Abandonment of Profit Sharing, 113.

ELECTRICAL PROGRESS.—Useful Electrical Force; In Kern Co., Cal.; A New Telephone System, 113. Transmitting Electricity Long Distances; Controlling Interest in Tuolumne Electric Light and Power Co.; Electric Lighting Companies in Japan; Monterey Power Co. Resumed Work; Electric Lighting Plant at Quincy; Petaluma Electric Light Co., 114.

PRACTICAL INFORMATION.—A Drop of Water; Resistance of a Train; "Overexertion;" Turquoises from Persia, 114.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 116–7–8.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 126.

MISCELLANEOUS.—Concentrates, 107. A Go'd-Paved Valley; The "Inventive" Faculty, 108. Complimentary Contemporary Comment; Rock in Place; Gold Deposits in Nicaragua, 109. Tirey L. Ford's Report, 110. Gold Milling at Grass Valley, Cal., 111. Glossary of Mining Terms, 112. Co-operative Gold Mining in Australia; Recent Additions to the Collection of the State Mining Bureau; A Vibrating Helmet, 114. California Mines and Miners, 115. Commercial Paragraphs, 116. Coast Industrial Notes; Obituary; Personal; Recent California Mining Incorporations; Recently Declared Mining Dividends, 119. Notices of Recent Patents; Annual Report of the California Debris Commission, 127.

THE party of American manufacturers now visiting South America have arrived in Brazil. In this regard a translation of a recent commercial article in a Chilean paper, which appears on page 119, is of present interest to Pacific coast manufacturers and merchants.

SEVERAL methods are in vogue for the preparation of timber for underground use where desired to be preserved from decay. The creosote process is probably the best. The wood is placed in an air-tight tank, a vacuum formed, and creosote pumped in at a pressure of 150 pounds per square inch, at a temperature of 120° F. Soft wood will absorb from 8 to 10 pounds per cubic foot, hard wood from 6 to 8 pounds. Steeping in naphthaline is also attended with good results, especially in the case of green timber. A mixture of salt and chloride of magnesium for dry wood will preserve it, and also render it incombustible.

REGARDING the recent appropriation by Congress of $250,000, there is this to be said: the Legislature of California made similar appropriation of similar amount in '93 contingent upon just such an appropriation as that recently secured. The Congressional appropriation was in mind when the State appropriation was made. Each appropriation was in good faith, the State and Nation have each complied with all the requests and all necessary conditions and nothing remains on that score but to apply the money so given. It is not in order to raise cavil or question motives or seek for technical flaws, but to keep faith, public and private, so expending the money as to best serve the interests of all concerned.

ANSWERING several suggestions from southern California, it is not believed to be good policy to attempt any repetition of the "suspension of assessment law" as enacted by Congress in July, '93, and November, '94. True, a southern California Congressman — McLachlan — introduced such a bill last December, but it was promptly and properly squelched. The whole matter has been discussed in these columns at considerable length. The act was a relief measure in '93 and a sort of sop thrown to claim holders in '94, but it was more of a loss than a benefit to the mining districts. A man who wants to hold a mining claim ought to put $100 in work or improvements on it every year. If it isn't worth doing that it isn't worth anything. While it costs money to buy powder, tools and food, and many a good man owns a good claim, though poorly equipped to develop it, yet it is just such men that are least benefited by the operation of such an act as that passed in '93 and '94.

Narrower Gauge.

In addition to some editorial remarks last week regarding the need and feasibility of narrow-gauge railroads connecting mining regions of this State, it is worthy of note that engineers now recognize the possibility of successful construction of such roads on a narrower gauge than was thought possible a few years ago. It was for some time held that even a three-foot gauge was impracticable, but recent construction of roads with but a two-foot gauge has shown the economic success of so limited a roadbed. Several such roads have been built in the State of Maine and are now in successful operation. They offer advantages in point of accessibility to mountainous regions where excessive curvatures are met and compare most favorably with cost of construction of roads with wider gauges, being also capable of conveying freight and passengers on a paying basis, being financial successes where roads more costly in construction and maintenance would be failures. Outside this country is an illustration in the case of the Zancudo Mining Company's Railway in South America—a two-foot gauge road, built where conditions precluded construction of anything wider. This road was built where occurred several curves of forty feet radius and in one place around a high rock cut at the head of a water course in a deep ravine which would have cost several thousand dollars to change. This road, twenty miles in length, does a regular freight and passenger business, the former running on a schedule of sixteen miles and the latter eighteen miles per hour. A similar road has also been built for the Sinaloa, Mexico, Silver Mining Co., which is likewise in successful operation.

On the Zancudo road the grade was five feet wide, ties four feet long, four inches thick to seven inch face, 2700 per mile, the rails cost on the grade $48.50 per ton. The spikes used were ⅝x4 inches. The average cost of grading, except rock cuts was $650 per mile; the rock cutting cost 70 cents per yard.

A still narrower gauge, twenty inches, is that of the Arizona Copper Co., Clifton, Arizona, on which a 17-ton engine is now running on a 24-pound per yard rail. The builders of the Zancudo road are now constructing a road in that country on a .6 metre—23.725 inch gauge.

The advantages are evident: First cost of construction would be much less, as sharper curves can be introduced, heavy excavations and embankmens avoided, cost of grading lessened at least one-half and correspondingly cheaper rolling stock procured, besides decreased expenditures for ties and rails, lighter cost of ballasting, surfacing. The cost of maintenance is also manifestly less than even for what is generally considered a "narrow gauge road."

There are disadvantages, but in a mountainous country, with steep grades, sharp curves and limited traffic, it is believed that the slow time, breakage of bulk, transfers, etc., would be more than counterbalanced by the improvement over stage and team. It is believed that the estimated cost as published last week could be still further reduced in such an instance as the one cited, where a narrower gauge road was built. That such roads pay is beyond question. The Antofogasto, Potosi & La Paz Railway—Chili-Bolivia, South America—is 570 miles long, laid with 30-pound rail. In '95 that road handled 870,000 tons of freight and carried nearly 2,000,000 passengers without a single accident, and with a light equipment, the heaviest locomotive weighing six and one-half tons. The gauge of that road is twenty-three inches. The net earnings for the year were 20⅝% of the total cost of construction and equipment.

This matter of narrow gauge roads has an intimate relation with California's mine development and is considered worthy the attention of those who in a large way are engaged in that work.

Liquid Air Considered Commercially.

An interesting illustration of the rapidity with which purely scientific discoveries frequently become the starting points of new industries is furnished by the case of liquid air. It is not a long time since liquid air was produced for the first time in quantities great enough to admit of its application for purposes of research, yet steps are already being taken to treat liquid air as an article of commerce and to turn it out upon a large scale.

As in most cases of the kind, laboratory methods require modification to suit the needs of wholesale production. Patents are being taken out for machinery which, though constructed upon the principles of that used for purposes of research, will attain the desired end with greater directness and with the omission of several intermediate steps. The necessary reduction of temperature to the critical point of air has hitherto been effected by the successive employment of liquefied gases boiling at lower and lower points on the scale. But the final decrement of heat has been won by the cooling effect due to the rapid evaporation of the product itself. The new apparatus dispenses with the use of these intermediate cooling agents and relies entirely upon initial compression by powerful engines and subsequent partial expansion of the compressed air under carefully regulated conditions.

Most people probably have seen, at one time or another, the familiar lecture-room experiment of forcing a piston suddenly down a cylinder and showing the ignition of a scrap of touch paper by the heat thus produced. If, while the compression is maintained, the cylinder and its contained air be cooled to the original temperature, then, on suddenly withdrawing the piston and allowing the air to regain its original volume, there will be a fall of temperature corresponding to the rise on compression. If, now, the cooled air could be used to reduce the temperature of a second quality of air before expansion, it is evident that, starting from a lower point than the first batch, the second would, on expansion, reach a lower point. This is the first principle of the new liquid air apparatus.

A powerful engine compresses air, which is cooled, as far as possible, by ordinary refrigerating methods and passed into a spirally coiled pipe over 100 yards long. This pipe is enclosed in a second spiral. By means of a throttle valve at the end of the inner spiral, a certain proportion of the compressed air is allowed to expand in the space between it and the outer pipe. Thus, the stream of compressed air from the pump is cooled by that portion which has been allowed to expand, and arrives at the throttle valve in a colder state than the portion that preceded it. Consequently, it reaches a still lower temperature on expansion, cooling yet more powerfully the advancing stream in the inner tube. By carrying this cumulative cooling effect sufficiently far, the circulating air is at last brought down to its critical point and liquefies, after which a continuous stream of liquid air is merely a question of engine power.

It is impossible, without the aid of diagrams, to explain clearly how the continuity of the process is maintained, but the cycle of operations can be readily apprehended. There is compression, expansion in a closed chamber and utilization of the cold thus produced to repeat the cycle from a lower initial temperature.

The inventor's apparatus produces a substance for which there is already an industrial demand—oxygen gas. During the process just described, the air becomes steadily richer in oxygen until that gas forms some 70 per cent of the product. This relatively pure oxygen is sufficiently good for certain purposes, and it may be further purified from nitrogen if desired.

The price of oxygen gas thus obtained compares favorably in respect of cost with that produced by the methods now in use. It is apparent that this process is an affair of engineering far more than of chemistry. This remark applies to many of the most important and lucrative manufacturing processes of the day, and engineering chemistry, or chemical engineering, is to-day one of the foremost factors in the world's progress.

Concentrates.

UTAH mines paid $162,000 dividends in July.

SAN BERNARDINO, Cal., wants a "mining exchange." Why not?

THERE are 55,000 men now employed in the mines at Johannesburg, South Africa.

THE shares of the Anaconda Mining Co. will be quoted on the Paris Bourse next month.

QUIGLEY, Montana, will have a new 100-stamp mill in operation at the Golden Scepter next month.

P. KEYES, Beveridge, Inyo Co., Cal., cleaned up $3000 last week and wants to build a 10-stamp mill.

SINCE Oct. 16, '95, the receipts of the California Miners' Association have been in the neighborhood of $8000.

LEAD is now down to about the lowest figure in the history of its production in this country -$2.85 per 100 pounds.

CARIBOO, B. C., hydraulic miners figure the cost of washing a cubic yard of gravel at 5 cents—a moderate estimate.

THE value in gold production of each man's work in the Rand, South Africa, district in '95 was $695; in '94, $800.

COLORADO miners estimate that there are $30,000,000 in low grade ore on the dumps that will now pay to concentrate.

PETTY THIEVES, the bane of every rich "specimen" gold mine, are at work at the Gilt Edge mine, Fergus, Montana.

A TWENTY-STAMP mill for custom ore is stated to be the present greatest want at the new camp of State Line, Nevada.

THE next meeting of the U. S. Debris Commission will be held at their room, 59 Flood building, this city, Aug. 24th, '96.

WORK has begun on Montana's new school of mines at Butte. It will cost $88,000 and will be finished August 1st, '97.

THE 1896 convention of the California Miners' Association will be held in Pioneer Hall, in this city, beginning November 10th.

SAM'L Newhouse of Salt Lake, Utah, has an option on the Holtz and Empire, formerly known as Amador No. 2, for $200,000.

ROSSLAND, B C., papers report a "rush" from there to the north fork of the Salmon river, where unusually rich placer ground is reported.

THE Alaska-Mexican new 60-stamp mill, Douglas island, Alaska, is completed and will shortly begin increasing that property's bullion product.

A RECENT cloudburst in Cat Creek, Esmeralda Co., Nevada, uncovered a 12-inch ledge of $40 ore, which was promptly located and is being worked.

DURING July the two Helena, Montana, land commissioners classified 14,000 acres of land. Pity a similar statement could not be made regarding California.

AT THE recent rock-drilling contest at Rossland, B. C., Davis and Stevenson won the purse and championship, drilling 36¼ inches in fifteen minutes.

LARGE holders of Boston & Montana stock figure that at the present price of copper the company is earning $22 per share per annum, says the *News Bureau*.

AT Helena, Montana, last week, John S. Harris, a "promoter," was awarded $3000 commission due him from Murray Bros. on the sale of the Prize mine.

MRS. MCGRUER has been elected a member of the Karangahake, New Zealand, Miners' Union, believed to be the first instance of the kind on record—in New Zealand.

THE Champion Mining Company, Nevada City, Cal., has bought the Spanish mine, through which the Merrifield mine will be worked. The price is stated to be $20,000.

"SILVER rises above party," says the Butte *Inter-Mountain*. It is a noticeable fact that through all the recent favorable action by political conventions, it does not rise above 68¾.

D. KEITH of Salt Lake, Utah, has bought a two-thirds interest in the south extension to the Virtue mine, Baker City, Or., now known as the Con. Virginia. Jno. Vass is resident manager.

THE Morris Ravine, Butte Co., property, is in the hands of an English company with $75,000 capital. It comprises nearly three miles of ancient river channel. The tunnel being driven is making fair progress.

DURING July the Alaska Treadwell Mining Company sent 20,513 tons ore to its mill which averaged $3.72; 365 tons of sulpherets were also treated. The bullion product was $76,260; expenses $22,563.

THE biggest kind of a mining "boom" is reported from Tasmania. A long account of the great mining activity, to hand, fails to intimate whether the properties so glowingly described are gold or silver.

AN eastern paper thinks that the silver claim of 16 to 1 is absurd, adding that the most radical advocate of free silver coinage ought to be satisfied with a ratio of 12 to 1. This is, indeed, a "campaign of education."

J. B. HOBSON thinks the Cariboo and Horsefly mines, Quesnelle Forks, B. C., will make a good showing at the close of the season. It is calculated the Cariboo mine will send down $200,000 as the result of the cleanup.

SOME two years ago $200,000 was paid for the Bonanza mine, Harqua Hala, Arizona. It was recently considered worked out, and was turned over to leasers, who recently uncovered at 200 feet a four foot body of $50 ore.

ACCORDING to a local paper a California miner, stranded at Cook's Inlet, Alaska, writes to a friend as follows: "Offer a premium at your next fair for the 'biggest fool in the country,' and I'll try to get there in time."

THE usual practice in prospecting in West Kootenay, B. C., is to prospect in twos and threes. Each man stakes in his own single name and then records transfers of an even share with his partners, in his and their claims.

SUPERINTENDENT CAMPBELL of the Browns Valley, Yuba Co., mine denies local reports of a cut in wages and says since he took charge he has advanced wages, now paying practical miners $3 for underground work and $2.50 to helpers.

AT the Uncle Sam mine on Squaw creek, north of Redding, Cal., last Tuesday, M. Hostetter, a miner in the employ of the Sierra Buttes Gold Mining Company, was struck by a falling rock and knocked down an ore chute. He fell a distance of 200 feet and was fatally injured.

IN Amador, Nevada and other counties teams are practicing for the hand drilling contest at the State Fair next month, when $800 in prizes will be awarded. Those who propose entering for the contest should so notify Edwin F. Smith, the secretary at Sacramento, before Sept 1st.

THE excitement and distraction of the presidential campaign need not deter the California miner from going right ahead in augmenting the "flood of gold" that our English friends say is such a probable calamity that it may result in the demonetization of the yellow metal.

IN Sacramento county F. D. Ryan, District Attorney, and R. T. Devlin, representing the anti-Debris Association, have secured a temporary injunction against J. R. Vandergrift and a number of others from mining by the hydraulic process on the headwaters of the Cosumnes river.

PARTIALLY after the fashion of Congress in '93 and '94, the British Columbian Gold Commissioner has extended the time of sixty days from July 17th, for the completion of assessment work on such mineral claims as he has cause to believe are inaccessible in consequence of the depth of snow which covers the claims.

AMONG the present curiosities of mine "promotion" or degradation is noticed the "Antimony-Gold-&-Complex-Ores Extraction Co.," with a capital of $1,750,000, of which $1,500,000 goes to the alleged patentee for his valuable process of ore extraction, which has been more or less familiar to the mining public for the last twenty years.

TO READ an incription on a silver coin which by much wear has become wholly obliterated, put the poker in the fire, when red hot place the coin upon it, and the inscription will plainly appear of a greenish hue, but will disappear as the coin cools. This method was formerly practiced at the mint to discover the genuine coin when silver was called in.

THE purchase recently noted by the New Idria Quicksilver mine, in San Benito Co., by the trustees of the Napa and Etna Quicksilver Mining Companies will result in the full development of the property, and the operation of new works now in progress of erection. The mine has produced at times, a monthly average of 1500 flasks of 76½ lbs. each.

THE total Australian gold yield from the discovery of gold in those colonies to the close of '94, was 94,967,451 ounces, valued at $1,852,333,615. Of this Victoria furnished 59,000,000 ounces; New Zealand 12,750,000 ounces. Victoria gold averages $19 per ounce; parts of Queensland as low as $12.50, though in Cloncurry, Central Queensland, it goes nearly $20 to the ounce.

THE Witwatersand, South Africa district, consumes 120,000 cases dynamite annually. It costs the companies there $21.25 per case; at Kimberly $15.75. Nobel's sell it in Kimberly for $12.50 per case at a profit. It is locally figured that under better business arrangements it could be sold at $8.75 per case on the Rand, saving the mines there an overcharge of $2,000,000 annually.

THE installment plan of providing capital for developing a mining property (no reference to assessments) is often found to work satisfactorily. When there are no ornamental salaried officers and the proceeds of the sale of the working capital stock is devoted exclusively to the development of the mine, the stock not delivered till fully paid up, it usually affords safe opportunity for small individual investments.

THE Humboldt, Nev., sulphur mine is about forty miles from the railroad at Humboldt station. It has been worked about eighteen years. An attempt is now being made to operate it. The crude material has to be carted a distance of four miles to the refinery. This is undoubtedly a valuable property, but will require some outlay to develop it in a business way. The refinery is located about four and a half miles from the point where the sulphur is extracted

SOME time ago in Amador county, the Keystone Con. M. Co. sued the South Spring Hill M. Co. for damages, amounting to nearly $2,000,000, alleged value of ore extracted from plaintiff's ground. The case was transferred to Calaveras county. A motion by defendant for permission to enter and inspect plaintiff's premises, claiming that the latter was trespassing upon the dip and end lines of the former's claim, has been granted by Judge Gottschalk, the time being limited to the 30th inst.

THE oil-burning locomotive for the Congress Gold Company, of Congress, Ariz., has been tested on a trip over about 30 miles of the D. A. V. & P., which gave the desired up and down grade similar to that of the road for which it is intended. It went up the hills with a string of 20 freight cars, under the supervision of G. W. Prescott, of Highlands, Cal., the inventor of its oil-burning device. The engine is also adapted for switching in cities or in tunnels where there may be special danger of fire from sparks.

AT THE Congress mine, Arizona, the shaft is now down 1800 feet and 350 men are employed under ground. In addition to a cyanide plant with a capacity of 100 tons, there is a 40-stamp mill which runs day and night, and forty more stamps are to be added. About four miles of tunnels, shafts and stopes have been run. Beside the 1800-foot shaft, two others have been sunk to depths of 700 and 1100 feet respectively. Cross-cutting to the second vein has been commenced. The present output of the mine is $80,000 per month.

IN these days of presidential campaign dullness and financial distress the activity in mining is a Godsend to business men. A State like Washington, where the cities outgrew the country and stagnation resulted, is kept up now by mining enterprises and developments. Spokane, in some ways Washington's chief city, is prospering by control of British Columbia mining properties; Butte and its great mining industries keeps Montana prosperous; and so it may be said of nearly every commonwealth west of the Rocky Mountains. In our own State the most profitable market home producers now find is in the purchases of those engaged in gold mining.

COLORADO'S railroad competition has ceased and the old rates on ore have been resumed. The Colorado Midland and the Midland Terminal road dispute affected the mining industry at Cripple Creek. The former road runs to Divide, where junction with the latter is made for Cripple Creek, 30 miles distant. The Terminal has no cars, having used the Midland's previously. Freight over the two lines to Colorado Springs was abandoned about four months ago. The Florence and Cripple Creek road had been doing a considerable business in connection with the Denver and Rio Grande, but this road's 400 cars proved inadequate, and quantities of ore were banked at the mines.

AS TO the Colorado leasing system, referred to on page 85 of last week's issue, it consists, substantially, in a contract with the owners, leasor agreeing to do a stated amount of development work to keep a certain number of men at work during the continuance of the lease, and pays a royalty of a certain per cent when shipped, varying from 10 per cent on low grade to 35 to 40 per cent on high grade. This royalty is usually figured on the proceeds of the ore after deducting freight and treatment charges. Suppose the gross value of the ore were $50 per ton; freight and treatment, $12; the royalty would be whatever per cent of $38 had been agreed upon. It is generally customary to get a bond running with the lease, but the amount paid as royalty is seldom applied as part of the purchase price, the royalty being considered as rental only. The contracts are made from nine to eighteen months—a year being the general term. A failure to do a certain number of days' work in any one month makes a forfeiture, so the property is not tied up without a consideration. The bond price is usually made larger than it would be on a cash basis.

A SERIOUS fire and explosion was narrowly averted at the Portland mine, Victor, Colorado, last Saturday by the presence of mind of some of the employes. A miner coming off shift carelessly stuck his candlestick, in which was a lighted candle, into the side of the new Burns shaft house over a box in which were giant powder, caps and fuse to be used for blasting purposes by the shift of men who had just gone to work. The candle fell out and ignited a mass of paper behind the box of explosives. Williams, the engineer at the mine, and a miner named Smith saw the burning material and hurrying to the spot removed the powder before it took fire. They then extinguished the flames.

THE decision of the privy council of Great Britain in what is known as "the precious metal case" has been given, and sustains the two judgments of British Columbia courts. The point was whether or not gold or silver within lands passing to the Esquimalt & Nanaimo railway by their grant from the Crown thereby became the property of the railway company, or remained in the same position as elsewhere located, sought by the miner. This point, submitted to the supreme court of Victoria, B. C., in a test case, was decided in favor of the Government. This appeal was then carried by the railway company to the higher tribunal, whose judgment is confirmatory of the decision of the courts below.

THE North Bloomfield case was before the U. S. Circuit Court in this city this week. It involves the constitutionality of the Caminetti law. Action was begun by the Federal Government, at the request of the California Debris Commission, to restrain the North Bloomfield Mining Co. from continuing hydraulic mining without receiving permission from the California Debris Commission. A demurrer of the defendant company was overruled. The argument this week was upon the answer to the complaint, in which the claim was made that as only light matter was being sent into the Yuba there was in consequence no injury to the stream and the California authorities had no right to interfere. Judge McKenna is trying the case. The argument was closed and submitted last Thursday.

SINCE 1856 Grass Valley and Nevada City, Nevada Co., have produced $148,000,000 in gold. This is not by any means the whole of Nevada county's contribution. The Bloomfield district and the Idaho-Maryland group and other famous districts of that one county have turned out millions. East of Wolf creek, including the Empire (which is down 2200 feet) the yield has been over $20,000,000. The total is but an index of the gold wealth yet to be developed, and Nevada is but one of thirty-seven mining counties of the fifty-seven comprising the State. The belt on the east side of Wolf creek, not including the Idaho-Maryland group, but taking in the Empire and the mines to Slate creek, also the Norambagua and the Shamrock, has produced $21,962,742. The Empire is down 2200 feet, being the deepest in the group of seventy gold mines.

QUICKSILVER melts at 39°, evaporates slightly at ordinary temperature, boils at 662°, and volatilizes at 680°. Its specific gravity is 13.6 at 32°. Two thousand and thirty-eight cubic inches weigh one pound. One cubic foot weighs 847.89 pounds. In a column of quicksilver, every foot in height gives a pressure 5888 pounds per square inch. That quicksilver will pass through a smaller aperture than water is a popular fallacy, naturally deducted from the fact that the former will often leak from a vessel that will hold the latter. An explanation of this seeming paradox is that quicksilver, being so much heavier, gives far greater pressure, and in wooden vessels, water having the finer penetration, enters the fibre of the wood and swells it, thereby closing small openings, whereas quicksilver, entering only the open grain, has no expanding effect.

PHILIP DEIDESHEIMER has brought suit against W. H. Hollister, A. N. Butts and others to recover 16,666⅔ shares of stock in the Golden Gate Mining and Milling Company, or its value, which is estimated at $40,000, together with exemplary damages in the sum of $10,000. The plaintiff alleges that he owned a sixth interest in the Mabel, Noonday, Grasshopper and Gold Dipper lodes, Camp Floyd district, Utah, and that at a certain time Hollister, then president of the company, came to him and, under the pretense that such a procedure would facilitate a sale of the property, induced him to transfer to him all of his stock; that this transfer was made in the presence of witnesses and was clearly understood to be only a formal transfer, the property right being still vested in himself; that thereupon Hollister transferred this property to his wife Augusta, for no valuable consideration, its object being solely to deprive Deidesheimer of his rights.

AT a meeting of the executive commmittee of the California Miners' Association in this city last Monday T. L. Ford, who represented the association at Washington, D. C., for four months ending May 22nd, reported his expenses for that time were $3211.25. He had received $2950. It was decided to reimburse him for the excess of expenditures, $261.25, and pay him $1000 for his efforts in behalf of the association. Resolutions were adopted thanking him for the zeal and ability he had displayed in behalf of the mining industry of the State. Mr. Ford was absent from the room when the proposition to pay him the $1,000 was adopted, and, upon learning of it, wrote a letter to President Neff, in which he says: "No one could appreciate more highly than I do the sincere and worthy motives that governed the committee in their attempt to thus recompense me for the time which I had the honor to devote to the cause which we all have at heart. On the other hand, the committee could scarcely have taken any action that would have been more at variance with my personal desires. While profoundly grateful for the kindness thus intended to be shown me, and deeply moved by the kind expressions of personal regard so freely tendered me by yourself and others at last evening's meeting, I must, nevertheless, decline to accept any pecuniary compensation for the humble services I have rendered the California Miners' Association."

A Gold-Paved Valley.

Written for the MINING AND SCIENTIFIC PRESS by DAN DE QUILLE.

In the course of the untold ages during which they have had an existence the rivers of the Sierras must have carried down and deposited in the level valley region of California hundreds and thousands of millions in fine gold. Gold in its native state is a very soft metal, and, as is well known, suffers great loss from attrition. Even after the metal has been hardened by an alloy of copper and coined, it is rapidly worn by handling. Gold coin always loses more or less by attrition during transportation, however carefully it may be moved and carried. The loss sustained when large quantities of gold coin are shipped to and fro across the ocean is astonishing. Whenever a gold coin is subjected to motion and friction it loses more or less in substance. When carried in the pocket, and even while passing from hand to hand, it is wearing away.

The amount of gold found to accumulate in a few months in the tanks in which the workmen in large jewelry manufactories are required to wash their hands is quite surprising, and in the course of time the floors, carpets and all the interior parts of such establishments become very profitable auriferous deposits. There being such loss of gold with the most careful handling, one may form some idea of the tremendous wear and tear that must have occurred when the soft native metal was subjected to the grinding action of the boulders and gravel of the steep and swift California rivers.

For ages and ages before the discovery of the auriferous deposits of California, gold must have been carried down from the great hills and mountains, constituting or contributing to build up the Sierra Nevada range, at first through the old dead rivers and afterward through the present river system. Owing to the precipitous character of the creeks, canyons, gulches and river channels in the upper parts of the western slope of the great range, vast quantities of gold must have been carried down into the valley region, in which the beds of all streams are comparatively level. At times of great freshets, when there were big rushes of water from unusual accumulations of snow in the high Sierra, tolerably coarse gold would be swept down through the steep rocky troughs constituting the channels of all the large streams. In the big spring floods boulders weighing many tons are sent bounding down these big stone troughs like tenpin balls. At such times, not only fine gold, but also large nuggets, would be gradually driven down toward the level of the valleys. They would eventually get there, as they would never move upward a fraction of an inch, and each big flood would carry them farther downstream if it moved them at all. Even when wedged into a crevice in solid rock a lump of gold is not anchored forever. We everywhere find places where the channels of rivers have worn down hundreds of feet. Thus it is not difficult to see that even the largest nuggets, from being ousted from their resting places and constantly driven from a higher to a lower level, must either eventually reach the valleys or be worn out on the way by the pounding and tumbling of boulders or the grinding of rushing streams of sand and gravel. When it is known that a gold coin suffers loss when passing from hand to hand, one may imagine what would be the effect upon a lump of the soft native metal mingling in a turmoil of whirling boulders and grinding gravel. It is a mill in which the hardest quartz is ground to powder.

This downward progress of gold from the mountains to the valleys doubtless went on for hundreds of thousands of years before the discovery of gold at Sutter's mill; therefore, it seems very probable that deep in the channel of the American, the Sacramento, and all the other principal California rivers, in their course through the valleys, there are immense deposits of the precious metal. As regards fine gold, it seems likely that a vast deal of it was swept through the streams to the level of the valleys in a short time after it was released from its matrix in the quartz veins. For ages while gold was thus being carried down through the rivers, the valley region was doubtless a bay. In this bay it is probable that a great deal of gold was deposited at no great distance from the mouths of the rivers, though the very fine particles might be scattered far and wide.

By far the greater part of the gold found in both quartz and placers is in fine particles. It is in the fine gold that the miner finds his regular pay, the nuggets coming in as so much extra—as accidental bits of good luck. Much of the gold in quartz and pyrites is microscopic, so fine as to be invisible even when an ordinary magnifying glass is used. It is because of this invisible gold that some ores yielding high assays show little or no gold in panning. The smallest particles of gold visible to the naked eye are about the 1-250 of an inch in size. A great deal of gold is of infinitesimal fineness. Under a microscope many particles are found to have a diameter of no more than from the 1 20,000 to 1-50,000 of an inch. Being of such smallness in the start, one may imagine the fate of such particles in passing down through miles of rocky canyons filled with rolling boulders. Only that it could not be, one would say that all such gold would be wholly lost. But, although infinitely subdivided, it would stop somewhere, though it might pass out into the ocean.

It is not unlikely that a great deal of this invisible gold found lodgment in the clay of the old river bars. If so, nothing would be seen of it in working the ground by ordinary mining methods, and even the most careful panning would show nothing. An assay of the clay of the pay channels of the dead rivers, of the big hydraulic mines and of other paying deposits might show it to be exceedingly rich. A vast deal of gold may have been lost to our miners in times past in the clay of the placers and river bars and channels. Probably a considerable amount of this would be redeposited when carried down to the level valley region.

Be this as it may, the valley country must be pretty well paved with gold, particularly where first entered by the Feather, American and other rivers that were rich in gold. It is probable that by sinking shafts at points near which these rivers entered the level country rich deposits of fine gold would be found by drifting on the bedrock. We have plenty of mining engineers who would readily undertake to put down a shaft and drift out beneath the present channel of any of the rivers. Some day miners will go into this valley region, sink shafts and set to work to recover the gold brought down by the rivers and deposited on the level or in the waters of an ancient bay.

Most of the gold may have been very fine, but it all found lodgment somewhere. It is almost impossible to annihilate gold. Even when gold coin has been worn away by being carried in the pockets of the people, or in passing from hand to hand, some trace of it can be found. Some time ago an American scientist took samples of mud from the streets of different quarters of London and carefully analyzed it. Mud taken from the busiest parts of the city showed quite an appreciable amount of gold and silver, with copper, tin, iron and some other metals. Mud taken from the poor districts showed some iron and copper, with very minute amounts of silver, but the most delicate tests failed to reveal even a trace of gold. One can hardly imagine the fineness of the particles of gold thus shed abroad.

How gold gets into some of the places where it is found is a mystery. Some time ago an Oregon paper, in noticing a new mining district, put in as a joke that the bark of the pine trees gave very good assays in gold. Now it seems to be a fact that gold does in some way get into the pores or fibers of certain trees or vegetable growths. About half a century ago Mr. Sage, a professor of chemistry in Paris, made a curious experiment. He collected and burnt a quantity of vines that grew near the banks of the river Seine. From the ashes of the vines he obtained enough gold to coin three napoleons. The experiment created quite a sensation at the time, but there was not much profit in it, as each of the twenty-five franc pieces thus produced cost the professor one hundred and twenty-five francs.

It seems that in the river Seine a small quantity of gold exists in a state of division so fine as to be invisible to the unaided eye. It is said that when the sand of the river near Paris is used in making glass the crucibles in which it is melted are frequently found to be gilded over at the bottom. In former times a sort of mining was practiced on the Seine at Paris by a class of men similar to the ragpickers of the present day. These men would buy five francs' worth of quicksilver and after passing the sand of the river over it all day they sold it in the evening for six or seven francs. For some reason this work was finally discontinued. Almost all the rivers of Europe carry small quantities of gold in their sands. Such are the Rhine, the Seine, the Aar, the Reuse, the Danube, and others; also the Clyde and many other streams in Scotland, Ireland, Wales and Cornwall. The gold now thinly scattered in many places in Europe would make some rich placers were there to occur topographical changes by which the auriferous ground would be sluiced down and redeposited in compact form by the natural action of large streams. Though one ton of sand from the bed of the Rhine yields only nine and one-half grains of gold, or one-fifth of an ounce, yet the the total amount of the yellow metal in that one river is immense. It has been found by careful examination and calculation that that part of the Rhine alone which flows through what was formerly French territory contains no less than 36,000 tons of pure gold.

If there is so much gold in a short section of the river Rhine—never remarkably auriferous—there should be hundreds of thousands of tons of the metal lying in the old channels beneath the valley region of California, as for untold ages not one alone but scores of the most famous gold-bearing rivers ever known have been sending down and depositing on the level constant streams of gold.

Tests of the auriferous deposits beneath the valley might be made by boring at points near where the rivers leave the foothills. An experiment of the kind, giving full particulars in regard to the various strata passed through, would be of great interest and value. The cost of boring down to bedrock in half a dozen places would not be very great. The material of the different strata should be carefully assayed, as panning or sluicing would not show the very fine gold, which is supposed to predominate.

DAN DE QUILLE.

The "Inventive" Faculty.

Written for the MINING AND SCIENTIFIC PRESS by W. H. SMYTH, C. E.

(*Continued from issue Aug. 1 '96.*)

Fourth—That the law relating to patents which provides this requirement involving metaphysical distinctions also provides that decisions relative to these subtleties shall be rendered by mechanics, chemists, lawyers, etc., but never by expert metaphysicians.

My critic seems to have taken seriously my suggestion of replacing the examiners and judges in patent cases with "expert metaphysicians," whereas it was simply poking a little fun in a mildly sarcastic way at a law which required, as an element in a common contract, an "indefinable something," the presence or absence of which "involves fine, subtle metaphysical distinctions," and which at the same time provides that mechanics, etc., determine if these metaphysical requirements have been carried out according to contract.

Not the slightest fault has been found with our judicial system in this connection, but heartfelt sympathy was impliedly expressed for the judge called upon to decide a case involving "invention."

Patent office examiners are courteous and efficient; indeed, it would be difficult to find a more thoroughly conscientious and competent body of officials. It is the interpretation of the statute which is called in question, not the execution of its provisions.

The law calls for the presence of "invention" so as stated in the next proposition.

Fifth—Examiners and judges determine its presence arbitrarily. * * *

As this is entirely ignored, it is assumed to be admitted as a just corollary from No. 3, which is acknowledged to be true.

Attorneys at law without exception fear the defense in infringement suits which sets up want of "invention" in the device infringed. They know that the judge has nothing to guide him, no criterion. The only course open, therefore, is to make the patented device appear as wonderful and mysterious as possible, in an effort to impress upon the judge the amazing amount of genius required for its production; and the judge decides the question of "invention" in the same manner as the "average man."

Sixth—That it (the word "invention") should be removed from the statute and the idea eliminated from the practice both in the patent office and courts.

The reply to this is: "We should be compelled to substitute for it some other equally indefinable, and therefore equally objectionable, term."

This clearly is based upon a misconception. Substitution is *not necessary*—simply the *erasure* of a useless word and elimination of an erroneous interpretation. Section 4886 of the revised statutes reads: "Any person who has invented or discovered any new and useful art, machine, etc., * * * may * * * obtain a patent therefor."

So, unless my critic is prepared to saddle upon the word "discovered" all the occult, mystic, metaphysical meanings and curious attributes read into "invention," not omitting indefinableness, this criticism is without point.

Is it not strange that while all authorities are agreed that the word "discovered" in this section is absolutely synonymous with "invention" it has never occurred to the same authorities to hold that "invention" is synonymous with "discovered?"

A curious paradox, indeed.

This simple rearrangement of ideas, hardly amounting to a change, would put an end to all difficulty and confusion arising out of the conflicting and questionable, if not wholly erroneous, interpretation of section 4886.

This happy consummation is but one of the many and profoundly beneficial results which must inevitably follow from discarding the illogical and unscientific assumption that the production of new and useful contrivances "involves the spontaneous conception of ideas" to the exclusion of skill, knowledge and reason.

To summarize: It has been shown that the

Opening criticism is based upon a misconception and directed against an unwarranted assumption supported by illustrations in no way parallel.

That the first proposition develops a difference of opinion on a question of fact, which (decided either way) is immaterial to the main issue.

That the second proposition is left untouched, barring an unsupported assertion, which is at variance with the stated experience of acknowledged and constituted authorities on the subject.

That the third proposition is admitted as true.

That the fourth proposition, though ironically in-

tended, is strictly logical. The serious argument against its practical advisability amounts almost to reductio ad absurdum proof of the absurdity of the present legal interpretation of "invention."

That the sixth proposition is tacitly admitted, the criticism being directed wholly against a suppositious and uncalled for result.

That the fifth proposition is tacitly admitted by silence and by direct admission of the third proposition.

So that one proposition (No. I) is met by unsustained denial.

The criticisms on two (introductory and No. 3) are based upon misconception.

Three (Nos. 3, 4, 5) are either directly or tacitly admitted.

Upon this showing further direct comments are superfluous.

In the long and exceedingly fair-minded criticism of the *Engineering Magazine* only once does the writer feel that he has cause to complain, and, strange to say, the remark referred to is doubtless intended to be complimentary. It is as follows:

"* * * we dissent from the views expressed, * * * although we readily admit that *in their support* Mr. Smyth has presented a *very ingenious argument.*" The London *Engineer* tries to discredit the facts presented in the papers under discussion by the assertion, reiterated, that Mr. Smyth cannot have invented anything himself, or he would not talk as he does about "invention" and the "inventive faculty." And now the *Engineering Magazine* discredits the same facts on practically the opposite suggestion, that the "inventive faculty" is too much in evidence.

"Invention," the indefinable requirement of patent law, is from beginning to end an almost unbroken succession of dry, admitted facts, truisms and hackneyed quotations from acknowledged authorities, like beads on a string. Like beads, too, the stringing displays neither ingenuity nor lack of it; the presence or absence of those qualities in no wise effects either the (2) facts or the (1) beads. Both beads and facts would still be in evidence, whether strung by sage or, well, by the present writer.

Over thirty years ago the great scientist, Tyndall, relegated to the limbo of discarded superstitions the remains of the "spontaneous generation" myth. The death struggle of that tenacious old fetish is one of the earliest recollections of the writer. With the extinction of the idea of "spontaneous generation" as a factor in the production of living forms, bacteriology took its place among the recognized sciences.

If the present contention be well founded, and "Invention," the unrecognizable and "indefinable something," prove to be a relic of ignorance, with no foundation in reality—a myth—and industry, skill, knowledge and reason the real factors, as suggested in the answer to the question: "Is the inventive faculty a myth?" and also in the later paper, and that inventing is an art acquirable and cultivable, does not this mean the dawn of a true age of "invention"? Is it an unwarranted assumption that, under these conditions, the production of means to improve and facilitate man's adjustment to his environment will no longer be a haphazard groping in the dark, but instead, this class of mental industry will be systematized into a science of "invention"; that specialists in this science will be a distinct, recognized and organized branch of industry, engaged in devising new and better means to accomplish predetermined ends, to whom such work will be as much a matter of course and orderly routine as it is now to build a bridge fulfilling known conditions. Education cannot but be profoundly modified by the new idea of "invention." Is it not almost incredible that, notwithstanding modern civilization apart from the results of "invention" is unthinkable, the preparation of the youth has no bearing whatever upon this stupendous factor in the conditions under which he is expected to assume the part of an active and *intelligent* worker?

The direction in which education should be modified to meet the rapidly-changing conditions of modern times is towards the cultivation and improvement of the *physical* avenues of the mind.

Not for one moment would the writer desire to be thought of as depreciating purely scholastic training, or what is loosely termed "higher education." But this is an age of individual and concerted action of intelligent individuals—action, the result of knowledge and thought.

If I were asked to point out the distinctive characteristic of the latter half of the Nineteenth century, this peculiarity would receive careful consideration: the widespread increase of *thinking* workers, as distinguished from thinkers or workers.

Success is attained not by what a man knows, but what he *does*.

Therefore, education should largely consist in systematic training of the physical faculties—the eyes, the ears, the hands, etc.—through which alone knowledge is attained, so that impressions conveyed to the brain shall be accurate and undistorted; systematic cultivation of the faculties employed in recalling accurately previous impressions; systematic training and cultivation by exercise (under certain conditions (2) approximating commercial necessity) of the logical and (1) constructive faculties; all directed to the building up of personal initiative and logical thought, as displayed in constructive work.

Even the most insistent advocates for the sporadic and fortuitous gift idea of the "inventive faculty" concede the great advantage of systematic cultivation of the faculties, claimed by the writer to be those involved in the production of new and useful contrivances, to all who in the lottery of birth have failed of the capital prize "Genius."

San Francisco, July 16, '96. W. H. SMYTH.

Complimentary Contemporary Comment

The following, from a mass of similar kindly notices, valued and appreciated, are selected as illustrative of unsolicited opinions from various reputable sources of the standing and merit of this journal. Pages of such exceedingly complimentary reference could be published, but the following will suffice:

THE OLDEST AND THE BEST.

The MINING AND SCIENTIFIC PRESS of San Francisco has entered upon the thirty-seventh year of its existence, the oldest and the most ably conducted mining journal in the United States. Its very appearance is sufficient evidence that it has attained the success which is so deservedly its due as the reward of its faithful service and sterling merit.—Mining Record, Juneau, Alaska.

DESERVES MUCH CREDIT.

The MINING AND SCIENTIFIC PRESS of San Francisco is publishing a table giving the names of the mines of California, their character, the number of men employed, location, name of superintendent or owner and their postoffice address. The amount of work necessary to furnish these details is very great, and that valuable mining journal deserves much credit for placing this data before its readers. The PRESS does not claim to be absolutely correct, but has taken all the pains possible.—Colfax, Cal., Sentinel.

VALUABLE AND INTERESTING.

A most interesting article on Cripple Creek appears in the MINING AND SCIENTIFIC PRESS. Its comparative nature makes it valuable to any one who has ever mined in California, going as it does into detail explanations of the geological formations of both States. The article is illustrated with half-tones of famous properties.—Adviser, Pueblo, Colo.

DESERVING OF LIBERAL PATRONAGE.

The MINING AND SCIENTIFIC PRESS has completed its 36th year. It is a journal which has done much in behalf of the mining industry of the State and is deserving of liberal patronage.—National-Bulletin, Plumas, Cal.

ITS INTEGRITY BEYOND SUSPICION.

The MINING AND SCIENTIFIC PRESS has just celebrated the completion of thirty-six years of active, uninterrupted and highly useful existence. It is a journal that has done more for the advancement of mining and scientific knowledge regarding this coast than all the other papers put together, for the reason that its readers have learned to trust its statements and know that it is always well informed and its integrity beyond suspicion. The PRESS has our good wishes for its continued prosperity.—Investor, Los Angeles, Cal.

RELIABLE MINING NEWS.

Every week the special correspondent of the MINING AND SCIENTIFIC PRESS from our county capital furnishes a lot of reliable mining news from our county.—Georgetown, Cal., Gazette.

CONDUCTED WITH ABILITY, FAIRNESS AND HONESTY.

The MINING AND SCIENTIFIC PRESS of San Francisco is 36 years old. The PRESS is the oldest mining journal on the American continent, and from its very inception to the present time has been conducted with eminent ability and with that fairness, coupled with an honest purpose, which has never been questioned. In other words, it has never been charged that the columns of the PRESS were for sale to unscrupulous parties wishing to boom their wildcat schemes. The PRESS has within the last year gone even beyond its former efforts at usefulness, and the *Record* most heartily congratulates Mr. Halloran on his success as general manager of its columns.—Amador Record.

LOOKED UPON AS AN AUTHORITY.

The MINING AND SCIENTIFIC PRESS last Saturday celebrated its thirty-sixth birthday. It is the leading mining journal of the West, and is deservedly looked upon as an authority. Its merits grow with its years.—Inyo, Cal., Register.

ABLE, EARNEST AND FAITHFUL.

The MINING AND SCIENTIFIC PRESS has completed its seventy-second volume. It was established in 1860 and has continued uninterrupted up to the present time. An able, earnest and faithful advocate of the mining industry and manufacturing interests, it has well earned the reputation of being one of the best publications on this coast, and fully deserves the liberal patronage it receives.—Downieville Mountain Messenger.

NO PART OF THE PACIFIC COAST IGNORED.

The MINING AND SCIENTIFIC PRESS of San Francisco announces the completion of the thirty-sixth year of its uninterrupted and useful existence. It is a high standard publication and everything pertaining to the arts and sciences, the advance of industry and the working of the mines has been noticed at length, and no part of the Pacific coast has been ignored in its pages.

A PARDONABLE BOAST.

The San Francisco MINING AND SCIENTIFIC PRESS has completed its thirty-sixth year of continuous usefulness. This journal is the oldest of its class in the United States, and makes the pardonable boast "that it never took a dollar to put anything in or keep anything out of its reading columns." May it never die.—Cripple Creek, Colorado, Prospector.

A STANDARD PUBLICATION.

The MINING AND SCIENTIFIC PRESS of San Francisco contains an exhaustive article on Cripple Creek from the pen of T. A. Rickard, State Geologist, profusely illustrated with engravings of Cripple Creek, Victor, Anaconda and a number of more prominent mining properties. The fact that so standard a publication as the MINING AND SCIENTIFIC PRESS devotes so much space to Cripple Creek mines is evidence of the firm hold that the Cripple Creek mines have taken upon the mining world.—The Mining Investor.

FIVE AND THREE TO ONE.

Printer's Ink, quoting from the advance sheets of the American Newspaper Directory, which gives the rating of all newspapers of America, reproduces the following in reference to the circulation of the MINING AND SCIENTIFIC PRESS:

Engineering and Mining.
American Newspaper Directory for 1896.

Among the engineering and mining papers in California none has credit for so large a regular issue as is accorded to the MINING AND SCIENTIFIC PRESS, published weekly at San Francisco. In fact, it fully equals five times the combined issue accorded to all others, and the publishers of the American Newspaper Directory will guarantee the accuracy of the circulation rating accorded this paper by a reward of $100, payable to the first person who successfully assails it.

The MINING AND SCIENTIFIC PRESS is the oldest mining journal on the American continent, being now in its seventy-third volume. It recently gave an exhaustive review of the Cripple Creek mining district, from which the Eastern and European press have largely quoted.—Denver, Colorado, Republican.

ABLE ARTICLES NOW APPEARING.

We regret not having the space to publish in full the able articles which are now appearing in the columns of the MINING AND SCIENTIFIC PRESS of San Francisco, Cal.—Black Hills Mining Review.

BEST AND MOST RELIABLE.

The MINING AND SCIENTIFIC PRESS of San Francisco is thirty-six years old. And, if such is possible, continues to improve. It is the best and most reliable mining paper published in America and no mining man should be without it.—Calaveras, Cal., Citizen.

THERE SHOULD BE A SECRETARY OF MINES.

The MINING AND SCIENTIFIC PRESS of California is urging the need of a Cabinet Secretary of Mining, and gives numerous reasons for the appointment. The strongest reason is, at present mining decisions are made by the Secretary of the Interior, or some sub who has no interest in mining and is absolutely ignorant of its needs. This department is certainly as important as agriculture, and we believe with the PRESS, there should be a Secretary of Mines, selected from among the many practical and scientific miners of the West.—Denver Mining Record.

AN APPRECIATED DISTINCTION.

The MINING AND SCIENTIFIC PRESS of San Francisco, Cal., has received the bronze medal and diploma awarded to it by unanimous vote of the World's Fair Commissioners. The award was for the high character of that paper, its accuracy and reliability, and must be valued as a fine tribute from competent critics. So far as known it is the only journal thus honored, and the distinction must be appreciated.—Mining Review.

CALIFORNIA CAPITAL INVESTED.

The MINING AND SCIENTIFIC PRESS is authority for the statement that in eight mines in Amador county an expenditure of a million dollars of California capital alone has been arranged for. This statement is made for the purpose of showing that capitalists in California show just as much faith in the business of gold mining within their own State, as manifested by their disposition to invest therein, as do capitalists from the outside.—Amador, Cal., Republican.

Rock in Place.

TO THE EDITOR:—Please allow me to comment upon the subject of the editorial in your issue of July 25th last—"What Is Rock in Place?" I premise by saying that, geologically speaking, no rock can possibly be "out of place" if it be where nature and the work of the elements have put it; and further, the term "rock in place" has no application to placers, nor, in my judgment, is it at all necessary to theorize as to origin when defining terms. As an expert on the stand, I have many times been obliged to answer the question and have invariably replied as follows: It is "any rock, mineralized or unmineralized, in the solid mass of the mountain *other than float.*" I have further historic precedent for this contention.

Mr. Geo. D. Roberts, an old-time mining man, formerly of this city, stated to me that the origin of the phrase was as follows: Late in the fifties and at the very first meeting of the miners of Grass Valley, in this State, to adopt "rules and regulations," the question arose as to what was "locatable." Some maintained that detached masses of mineral might, if valuable, be the subject of location. But it was decided in the negative on the ground that float, technically speaking, *i. e.*, in the sense used by the miners, was not "in place in the solid body of the mountain." Hence my definition.

W. S. KEYES, M. E.,
Vice-Pres't Cal. State Mining Bureau.

San Francisco, July 28, '96.

Gold Deposits in Nicaragua.

TO THE EDITOR:—The American Consul at San Juan del Norte, Thomas O'Hare, has submitted to the State Department at Washington, some interesting statistics relative to the gold deposits of Nicaragua.

Gold was first discovered in Northwestern Nicaragua, in November, 1888, and since that time, rich placers have been found along the Prinzapulca, and some of its upper affluents, some of the very small pockets yielding from $3,000 to $20,000 each; and it is generally estimated that the annual shipments of gold dust from that region since the date named have not averaged not less than $150,000.

The Nicaraguan Government imposes an export tax on gold of 49 cents per ounce, while gold entering Bluefields is also subject to a municipal tax of 12½ cents per ounce. A. F. TENNILLE.

Washington, D. C., July 29, '96.

Tirey L. Ford's Report.

The Executive Committee of the California Miners' Association met at the Union League Club in this city last Monday evening, the 3rd inst., to hear the report of Tirey L. Ford, who was in Washington, D. C., from January 24th to May 23rd, '96, in the interest of certain national legislation desired by the miners of this State.

The report, which consists of about 20,000 words, is an exhaustive account of his mission and its results, with a condensed history of the movement and its progress. Those who have read what has been published in these columns through all the months and years since the inception of the project will sufficiently understand the subject without further repetition.

A brief resume of the matter referred to in Mr. Ford's report is in order:

When he arrived in Washington four measures were found pending in Congress, the passage of which was desired by the California Miners' Association. They were:

1. A bill intended to reduce the penalties provided for in the so-called "Caminetti act," being officially entitled: "A bill to amend an act entitled 'An act to create the California Debris Commission and regulate hydraulic mining in the State of California,' approved March 1, 1893, by amending Section 22 thereof."
2. A bill intended to amend the Federal mining laws, with particular reference to the manner of locating, holding and working mining claims, and the transfer of contests as to the agricultural or mineral character of land from the land offices to the local courts, being officially entitled: "A bill to amend Chapter 6, of Title 32, of the Revised Statutes, relating to mineral lands and mining resources."
3. A bill looking to the segregation of the unpatented mineral lands within the railroad land grants in California, locally known as the "Mineral Lands bill," and officially entitled: "A bill to provide for the examination and classification of certain lands in the State of California."
4. A bill to appropriate money for the construction of works to impound mining debris and thereby to protect the navigable streams of California.

These bills may be referred to in the order above enumerated.

First—The bill to reduce the penalties provided for in the Caminetti act. The California delegation, at a meeting held early in February, '96, disapproved of the above measure, and it was, therefore, not further urged.

Second—The bill intended to amend the Federal mining laws was argued before the House Committee on Mines and Mining by Representatives Barham and Johnson and Mr. Ford, but no definite action was taken by the committee, though the committee seemed favorably disposed toward the measure, particularly with reference to the transfer of contests from the land offices to the local courts, to which latter particular the arguments were most strongly directed.

The pressure of work in connection with the appropriation and the mineral lands bill prevented further systematic effort in behalf of the measure for the amendment of the Federal mining laws, and the latter measure was therefore temporarily neglected. There should be no trouble, however, in securing its passage at the short session beginning next December, for the committee having it in charge is favorably disposed toward it and the California delegation is united in its favor.

The association's representative also laid the above measure before Senator Stewart of Nevada, chairman of the Senate Committee on Mines and Mining, and while he declined to commit himself on the bill generally, he expressed himself favorably in relation to the provision for the transfer of contests from the land offices to the local courts. He also left with Senator Perkins and Congressman Johnson, the authors of the measure in their respective houses, a typewritten statement of the wishes of the miners of California concerning this measure, together with the reasons therefor.

Third.—The mineral lands bill was introduced in the House December 26th, 1895, and referred to the Committee on Public Lands, where the same was pending on the arrival of the association's representative in Washington, January 24th.

Nearly all the members of the California delegation, together with Mr. Ford, appeared before the above committee in behalf of the measure, which became known as the California mineral lands bill. The committee insisted, however, upon modifying the bill in several particulars in order that it might more nearly conform to the provisions of the so-called Idaho-Montana act. To avoid the necessity of amending the bill in the House, and thus causing it to be reprinted, Mr. Bowers was authorized by the committee to report a substitute bill embodying the modifications agreed upon in committee. This was done, the bill was taken up, passed by the House and sent to the Senate, where it was referred to the Senate Committee on Public Lands. Here the opposition, backed by the National Administration, operating through the effective machinery of the Interior Department, made a strong and determined resistance. The Commissioner of the General Land Office addressed a lengthy communication to the Senate committee, setting forth with much vigor his objections to the measure and opposing its enactment into law. This letter had the added weight of the written endorsement of the Secretary of the Interior.

To this letter the association's representative, with the aid of Senator White, drafted a reply, which was signed by Senators Perkins and White, Congressman Bowers and the association's representative. (All this, including the reply, has been heretofore published at length in these columns.)

The bill was finally reported back to the Senate, with amendments, and its passage recommended by a unanimous vote of the committee. The bill, as amended, conformed substantially to the provisions of the so-called Idaho-Montana act, excepting the amendment reported by the committee relating to the classification of large bodies of well-known agricultural land, which latter provision is not contained in the Idaho-Montana act.

The bill was taken up for consideration upon the motion of Senator White and finally passed by the Senate, after having been amended as already noted, the amendments including the so-called Oregon amendment.

The bill was to be returned to the House in the usual manner, when some member of the House Committee on Public Lands, preferably the chairman Mr Lacey, of Iowa, or Mr. Bowers, California's representative upon the committee, was to move a non-concurrence by the House and ask for the appointment of a conference committee. The Senate, anticipating such action on the part of the House, named its conferees at the time of the passage of the bill, Senators DuBois, of Idaho, Pascoe, of Florida, and Pettigrew, of South Dakota, being selected by the Senate to represent that body in the conference committee. The Senators thus selected were all friendly to the measure and would have consented to a recession by the Senate from any of the Senate amendments that might have been deemed prejudicial to the final passage and approval of the measure.

The bill, however, upon its return to the House was referred to the House committee on public lands instead of a committee of conference, thus giving the measure a parliamentary status which Speaker Reed could not be persuaded to view favorably, though strongly urged to do so by the entire California delegation, and earnestly importuned by the Governor, Secretary of State, Attorney-General, State Controller, and other prominent officers and citizens of California. The bill, therefore, remains pending in the House awaiting the concurrence or non-concurrence in the Senate amendments. At the short session commencing in December and ending in March next, the bill can be taken up and sent to the President for his approval, after an agreement between the two Houses upon the pending amendments. In the meantime, it is suggested that the committee on mineral lands might profitably employ such means as it may be able to command to the end that no lands be patented to any of the railroad companies affected by the bill in question prior to the final passage and approval of the same.

HON. TIREY L. FORD.

Fourth.—Col. W. H. H. Benyaurd, Maj. W. H. Heuer and Maj. Thos. H. Handbury, of the Corps of Engineers of the United States Army, constituting what is generally known as the "Biggs Commission," made a report on February 9th, 1891, which was transmitted to the House of Representatives, and, on February 21st, 1891, was referred to the House Committee on Mines and Mining, being officially designated "Executive Document No. 267 (H. R.), Fifty-first Congress, Second Session," in which they dealt with the hydraulic mining question and the means of securing its rehabilitation. Referring to the effect of the suppression of hydraulic mining, the Commission says:

"Since the suppression of hydraulic mining, many claims that were formerly worked by the hydraulic process, so called, are now worked as drift mines, and the owners or operators have not been enjoined. On the large hydraulic mines, however, operations have been suspended, and many costly works incident to the industry have been allowed to go to decay; the mining camps have been deserted and large districts depopulated. The restriction has naturally had an effect upon the yield of gold in this State; to what extent, however, cannot be definitely stated. A reference to the gold production, as given in the table herewith, shows a decline in late years."

It is estimated by the Commissioners that over one hundred millions of dollars were invested in this branch of mining prior to its partial suppression by the courts.

At page 15 of this report, the engineers fall into an error quite common among those not familiar with the legal status of the hydraulic mining industry. They assume the industry to have been interdicted by the courts and its further conduct to be in violation of law. This, of course, was a mistaken view of the law, as will be more clearly understood by a reference to the opinion of the Supreme Court of this State in the case of Yuba county vs. Cloke, rendered in 1889 and reported in volume seventy-nine of the California Supreme Court reports. It was sought to enjoin the sale of water to be used in mining by the hydraulic process, concerning which the Supreme Court says:

"The sale of water was lawful and cannot be enjoined. The business of hydraulic mining, properly conducted, is lawful, and therefore the sale of water for that purpose cannot be enjoined."

Passing over the legal status of the industry, however, the engineers proceed to a discussion of the works necessary to arrest the flow of debris from the mines into the navigable streams, which is recounted at length in the report.

Through united efforts an appropriation item was reported by the Senate Committee on Commerce and, as now incorporated in the river and harbor bill, is as follows:

"For the construction of restraining barriers for the protection of the Sacramento and Feather rivers in California, two hundred and fifty thousand dollars; such restraining barriers to be constructed under the direction of the Secretary of War in accordance with the recommendations of the California Debris Commission, pursuant to the provisions of, and for the purposes set forth in, section twenty-five of the Act of the Congress of the United States, entitled "An Act to create the California Debris Commission and regulate hydraulic mining in the State of California," approved March first, eighteen hundred and ninety-three: *Provided*, That the Treasurer of the United States be, and he is hereby, authorized to receive from the State of California, through the Debris Commission of said State, or other officer thereunto duly authorized, any and all sums of money that have been, or may hereafter be, appropriated by said State for the purposes herein set forth. And said sums when so received are hereby appropriated for the purposes above named, to be expended in the manner above provided."

The Committee on Commerce had informally agreed to insert a specific reference to the first an-

nual report of the California Debris Commission, officially designated as "Executive Document No. 16, Fifty-third Congress, Second Session," but, at the request of Messrs. Ford and Johnson, the California delegation agreed to ask the omission of such reference from the final report of the committee. Senator White procured the requested change.

The final result was the passage of the bill as amended by the Senate.

In conclusion Mr. Ford says :

The movement for the rehabilitation of the hydraulic mining industry, begun with the formation of the California Miners' Association in 1892, has steadily advanced in public opinion, and has been favorably considered by the law-making bodies of both State and Nation. The foundation for ultimate success has been securely laid and, with united and determined action upon the part of those most deeply interested, the final result should not be a matter of serious doubt.

It should not be forgotten, however, that the work is but fairly begun, and that much remains to be accomplished. An unfortunate antagonism still exists in certain quarters, though, happily, confined to narrow and ever contracting limits. Our National Congress is slow to recognize the importance of the work, and is still in doubt as to the limits of its jurisdiction in the premises. Added to all this the miners of California are themselves not wholly in accord as to the best means of accomplishing the desired results.

The first matter that should engage the serious attention of the California Miners' Association is that of agreeing upon a definite line of policy to be pursued by the friends of the hydraulic mining industry in their efforts to restore it to its original station among the industries of California. Either the policy outlined by the Biggs Commission and amplified by the Caminetti Act should continue to guide the association in the future as it has in the past, or a new policy should be definitely agreed upon that would bring harmony and increased energy to the cause. As one who has watched the cause through its various stages, and has given to it a considerable degree of attention, your representative begs leave to suggest that it would be well to carefully consider any proposed change before departing from that policy which has hitherto guided the association, and to which Congress is in a large measure committed.

With a definite policy agreed upon, every energy should be directed to a proper presentation of our case at Washington, whence must come the final relief to which the miners of California are so clearly entitled.

Above all, absolute candor and fairness must characterize whatever course it shall be deemed most advisable to pursue. No advocate of the miners' cause, however ardent and enthusiastic, desires success at the disadvantage of any other interest, and no true friend of the cause will seek to gain a temporary advantage that must in the end but postpone the day of ultimate success.

The policy laid down in the reports of Col. Mendell and the engineers comprising the Biggs Commission, and thus far steadily adhered to by the California Miners' Association, would seem to afford a reasonable ground upon which all interests could safely stand. Such a policy carried into practical operation would cause such debris as could be safely stored behind properly constructed barriers to be permanently lodged in the canyons and foothills of the Sierras, while an improved river system, relieved in part of its ancient burden, would, by the aid of engineering skill, be made to carry the increasing commerce of the State without menace to the lands through which the rivers flow. These conditions once established, the rehabilitation of the hydraulic mining industry would speedily and easily follow, and the miner and the farmer would alike feel that their days of anxiety had permanently gone by.

San Francisco, June 30th, 1896.

The report was adopted and ordered printed.

Gold Milling at Grass Valley, Cal.*

Written by T. A. RICKARD, State Geologist of Colorado.

Mr. Abadie, in his excellent description of the work at the North Star mill, did not concern himself with the methods of his neighbors at Grass Valley. This was doubtless largely due to the fact that the mill of which he had charge was generally acknowledged as representative of the practice of the district.

The following additional matter, based on visits to this district made in December, 1886, May, 1891, and July, 1893, may, however, render the description of the milling practice more complete.

The first mill erected in California was not built at Grass Valley in 1850, as stated by Mr. Abadie. Mariposa county claims that distinction, and accords it to a mill of eight stamps, each in its own separate mortar, erected on the Mariposa estate late in the summer of 1850. It was not till the following January that a mill was erected on the west bank of Wolf creek, nearly opposite the site of the present Empire mill at Grass Valley.

Mr. Abadie's drawings and photographs very completely illustrate the position and interior arrangement of the North Star mill. The drawings are particularly valuable. The most notable change made in the North Star mill since my first visit in 1886 has been the new arrangement of the amalgamating tables. When going through the mill for the first time, I noticed the inadequacy of the amalgamating surface and the uselessness of the narrow sluice plates. Since then the shaking-tables have been replaced, in the case of the last two batteries added to the original thirty stamps, by new wide plates which are nearly 16 feet long. The old short apron and narrow sluice plate have been thrown out. The other six batteries were, at the time of my last visit, and, it would appear, up to the time of Mr. Abadie's description of the mill, still provided with the primitive apparatus which was first criticized by me nine years ago.

This is the great blemish of the North Star plant, which has followed in this respect the design of the typical Californian mill, whose narrow sluice-plates are a remnant of the apparatus originally borrowed by the quartz miner from the placer digger.

In order to discuss this question, a detailed description of the passage of the pulp on its discharge from the mortar will be necessary. The screen frame, which is 4 feet 4 inches long and 18 inches wide, has four partitions dividing the issue into five portions. Each division of the screen surface is 9 inches wide and 12¾ inches high. While this construction strengthens the screen, it robs it of 1 square foot of discharging area, and is not therefore to be commended. The pulp then drops 6 inches and strikes the battery plate, which is 4 feet 2 inches wide and 18 inches deep. It covers an iron apron which is bolted to the mortar.

Then there succeeds a trough from which the pulp passes through a distributor, consisting of a vertical iron partition pierced by twenty ¾-inch holes. Then follows a drop of 3½ inches to the apron plate. The latter is 4 feet 5 inches wide for 2½ feet, and then becomes narrowed for the remaining 2 feet, finishing with a width of 22 inches. Then come the sluice plates, 22 inches wide and 12 feet long. They had a slope of 1-inch per foot at the time of my visit, but according to Mr. Abadie, the gradient is usually greater, viz., 1¼ inches. The aprons are given 1½ inches per foot.

Then come the copper lined shaking tables. The new plates are 16 feet long, of which the upper portion, of 2½ feet, is 53 inches wide and represents the former apron, and the remainder is 46 inches wide, representing an enlargement of the sluices.

Mr. Abadie says that these new plates "cannot be too highly recommended," which is quite true when we contrast them with the old arrangement; but one may be permitted to ask, Why this narrowing of the plate from 53 to 46 inches? I take the liberty of emphasizing this matter because it has for many years seemed to me that the California stamp mill, otherwise the best machine of its kind yet evolved by the ingenuity of man, suffers seriously from an unsuitable arrangement of the amalgamating surface. In tracing the evolution of the apparatus of the stamp mill it will be found that the first gold-saving methods were modeled after placer mining practice, and that in the term "sluice plate" lingers the evidence of the transference of the sluice box from the gulch into the mill. The arrangement of 4 feet of plate as wide as the mortar, followed by 10 or 12 feet of plate somewhat under 1 foot wide, was almost universal in California a few years ago, one mill copying another apparently without inquiring into the object of the arrangement. At the North Star an examination of the sluices showed the edges of copper plate to be abraded or scoured by the swift passage of the pulp.

The philosophy of the sluice plate is not evident. The battery and apron have caught the coarser gold —that which it is easiest to arrest—and the object is to prevent the escape of particles which, because they were fine and difficult to catch, have not been stopped. Hence, the sluice plate is put in, but it is more a launder for the convenient conveyance of the pulp to the vanners than a gold-saving device. How can we expect to catch gold which would not be arrested on a wide plate, by passing it over a very narrow one? The quantity of water and crushed ore is still the same, but it is crowded into a much lessened space, the speed of its passage is increased, and the depth of its flow augmented. In some mills the grade of the sluice plate is actually greater than that of the apron.

Therefore the ordinary practice should be reversed, the apron should be succeeded by a wider rather than a narrower plate, additional facilities for the catching of the gold should be given by spreading the pulp so that every opportunity is afforded for its contact with the amalgamated surface of the plate.

The necessity for a uniform depth of battery discharge is hardly appreciated at Grass Valley. At the North Star no serious attempt was made to regulate it, so that it used to vary from 2 to 6 inches. Since my last visit it has become the practice to introduce cast-iron plates 2 inches thick underneath the dies. They have lessened the difference between the minimum and maximum depth of discharge, according to Mr. Abadie, to 2 inches. Although his account does not state the fact, yet the context would indicate that these plates are introduced after the dies have been worn down, thereby restoring the height of the issue. At the Empire old dies used to be placed underneath as the dies is use were worn down, and this was found preferable to employing iron plates for false bottoms (as at the North Star), because the latter broke so often. If they are made to fit snugly, this breakage should be no great detriment, as the pieces will remain in place. In addition to these methods, the Empire mill uses the device of fixing wooden cleats to the bottom of the screen outside. The sand banks up inside the mortar, and protects the unused strip of screen until such time as, the dies having worn down, the cleats are removed and the issue lowered. At another mill, the W. Y. O. D. ("Work Your Own Diggings"), the dies are discarded before they have worn down deeply. The remnant is sold to the local foundry, and helps to pay for new dies. This is wise. The consumption of a few pounds of iron is a very small matter compared to the importance of maintaining the conditions best adapted to good work. When the depth of discharge varies between wide limits, the operation of the mill must be irregular. The minimum and the maximum depths cannot be equally favorable to the particular conditions required, and an effort should be made to find the exact depth best adapted to the treatment of the ores of the special mine, and that figure should then be maintained as far as is practicable.

In the matter of screens, the Grass Valley mills have, as it seems to me, taken a retrograde step The general adoption of punched tinplate in place of wire cloth is defended on the ground of economy. Thus, Mr. Abadie says that "the life of a tin screen is about thirty days; the cost, one-fourth that of wire screens." As a rule, at Grass Valley, the brass wire screens cost $1.55 apiece, while the tinplate costs 55 cents per screen, the former giving a service of twenty-five days, the latter fourteen or fifteen days. Steel-wire cloth was discarded because that which was used in this district had the defect of a shifting of the horizontal wires. The introduction of tinplate into the Californian mills dates several years back. I first saw it in use at the Utica mill, Angel's Camp, in 1886. In 1893 the Idaho was the only mill in Grass Valley which was not employing tinplate in preference to wire cloth. It is the usual custom to burn off the tin upon the blacksmith's forge, with the idea that the iron plate becomes annealed and toughened. Since tin amalgamates, its removal prevents the adherence of mercury to the screens.

The cost of screens per ton of ore varies from ¾ to 1 cent per ton, an item of expense which is trifling when compared to the importance of getting a screen which will properly size the pulp and aid in maintaining the conditions most favorable to good amalgamation. No one at Grass Valley had, as far as I could learn, made any careful experiments to determine the action upon the pulp of the use of the two varities of screen. One would naturally expect a more free issue and a more uniform crushing when using wire cloth in place of punched plate, because the former has a discharge area approximately one-half of its surface, while the latter, having apertures of the same size, has less of them per square inch.

The milling practice of the Grass Valley district has undergone important changes during the past ten years. The introduction of an inside amalgamating plate—first done at the North Star in 1888—marked an important departure from the extreme type of fast-crushing California battery. The tendency to increase the percentage of inside amalgamation by deepening the discharge and inserting a chuck-block (which also carries an amalgamating plate) is a notable feature. Thus from a rapid pulverizer the California mill has been made an improved amalgamator. This older, very shallow-drop mill, unable to use a plate inside the mortar, and relying solely on the outside tables, has become rare on the Pacific slope. It has become a recognized fact that rapid crushing will not compensate for poor amalgamation; that the sooner we catch our gold the better; and that the best feature of the stamp mill, as compared to other pulverizers, is its capability to combine the crushing and amalgamating apparatus in one machine.

At the North Star and W. Y. O. D. mills nearly twice as much amalgam is obtained from the inside as from the outside of the mortar; while at the Empire the inside extraction is from 50 to 85 per cent of the total saving.

Heavy silver plating is recommended nowadays. The North Star plates carry one ounce of silver per square foot, those of the Empire have 2½ ounces, while at the W. Y. O. D., the newest plant, the amount has been increased to five ounces. One cannot remember too often that it is amalgam that catches gold, and that a good coating of gold amalgam is better than all the nostrums in creation. In starting a new mill or introducing new plates a good coating of silver helps to get the tables into working order in a short time, the silver being gradually replaced by gold. There is no economy in poorly plated tables or in short, narrow ones. No mill I have ever seen had too much amalgamating surface; many of them had too little. The value absorbed by the plates is an asset of the best kind; and there is no plate placed in a mill but will absorb some gold and be worth more when it is worn out and discarded than when it was first put in place. The following fact will be of interest in this connection: The old plates of 60-stamp mill of the Montana Co., Ltd., at Marysville, Montana, after 4½ years' steady work, 1887-1891, were scraped and melted down. (This was, of course, after they had undergone the usual periodical clean-up.) The twelve plates, each 54 by 96 inches, yielded $90,000. One plate gave as much as $8000. Even the small vanner plates, 16 by 48 inches, yielded $500 each.

The importance of the careful sampling of the tailings as a check upon the mill work is better appreciated at Grass Valley than in any other locality I have visited. At the Empire mill there is an automatic sampler, invented by Mr. Starr, the former superintendent, which does excellent service. The results indicate a saving of from 85 to 87 per cent, which is fairly representative of the district.

*Trans. A. I. Mining Engineers.

Glossary of Mining Terms.

(Continued from L. W. Tatum's Compilation.)

Gad—A small pointed wedge.
Galena—Lead ore; sulphur and lead.
Gallery—A level or drift; applied chiefly to collieries. A level from which the ore has been stoped.
Gangue—The substance surrounding and associated with the ore.
Gash Vein—A vein wide at the top and closing at a short depth.
Gallows Frame—The frame supporting a pulley over which the hoisting rope passes to the engine.
Gateway — A gangway having ventilating doors.
Geode—A cavity studded around with crystals or mineral matter; a rounded stone containing such a cavity.
Glance—A term applied to the sulphides of some metals.
Gneiss—Metamorphic rock, resembling granite.
Gossan—The decomposed matter on or in an ore deposit, composed of iron oxide.
Gouge—A clayey streak found next to a fissure vein.
Grass Roots—A term used where a working is started from, or worked up to, the surface.
Granite—A plutonic crystalline rock composed of feldspar, quartz and mica.
Gray Copper—Tetrahedrite. An ore containing copper 15 to 45 per cent, combined with iron, zinc, silver, mercury, arsenic and antimony. It varies in color, hardness and specific gravity.
Grub Stake—Provisioning a prospector on a bargain to share his discoveries.
Grizzly—A grating used to sort ore according to size.
Guide—The timbers nailed to the timbers of a shaft for the purpose of guiding the cage.
Gunboat—A skip; a self-dumping box used in slopes.
Hackly—Having a surface of rough points when broken.
Hade—The slope of a vein, usually applied to a fault.
Hanging Wall—The laying of rock, or wall, immediately over a lode.
Heading—Same as Breast; a vein of ore above the drift.
Headings—In placer mining, the mass of gravel above the head of the sluice.
Heave—The horizontal dislocation of one lode by another.
High Explosives—Those of greater detonating force than black powder.
Hitch—A hole cut in the wall to hold timbers.
Horn—An ox or buffalo horn, halved and used as a pan.
Horse—A mass of country rock between the enclosing walls of a vein. To constitute a horse, it is necessary that the walls converge about the mass below and at both ends, but the greatest known horses do not converge overhead. "The two walls coming to the surface are in some instances 1000 feet apart."
Hungry—Barren.
Hydraulic Cement—Sets under water. Made from limestone, containing alumina, magnesia and silica.
Hydraulic Mining—Mining placer gold with a stream of water under pressure.
Hydraulicking — Washing down a bank of earth or gravel with pipes conveying water under great pressure.
Igneous—Applied to all rocks cooled from a state of fusion.
Impregnation—Metallic deposits having undefined limits and form.
Incline Drift—An inclined passageway under ground.
Infiltration—The theory that vein filling was introduced as mineral water.
Injection—The theory that vein filling was introduced by an igneous fluid and solidified.
In Place—A vein, or ore, in its original position.
In Take—The entry which conducts the incoming air-current to the mine. It is synonymous with downcast.
In Situ—In fixed place. Original position.
Iron Hat—The out-crop of a lode, it being usually colored by the decomposition of the iron.
Jamb—Any thick rock which cuts off the vein.
Jig—A machine for concentrating ore by means of water.
Jigging—A method of sorting ore by shaking in a sieve in water.
Jump—To take forcible possession of a claim. (2) To relocate abandoned property.
Lagging—Timbers over and upon the sides of a drift.
Laundry Box—The box at the surface receiving the water pumped up from below.
Lean—Poor in metal.
Ledge or Lead—Mineral ores or gangue within fissure or contact veins.
Length—A certain portion of the vein when taken on a horizontal line.
Level—A horizontal passage or drift into a mine from a shaft.
Lift—All the mine workings connected with, opened from, and mined out at one level; also the length of pump-pipe between stations.
Litharge—An oxide of lead used in assaying.
Lithology—The study of rocks. Geology applies to formations of the earth.
Little Giant—A jointed iron nozzle used in hydraulic mining.
Live Quartz—A variety of quartz usually associated with mineral.
Loam—A mixture of sand and clay.
Location—The successive acts by which a claim is appropriated. (2) The claim itself.
Lode—Same as ledge or lead.
Magma—The liquid matter within the earth, the source of igneous rocks.
Massive—Not stratified. Without cleavage.
Matte—A mass, chiefly of metallic sulphides, obtained in the fusion of ores.
Measures—A term embracing the strata of a geological series.
Metamorphic—Changed in form and structure.
Mica—One of the constituents of granite. When separately crystalized, is found in clear laminated plates. Found in the lode as well as the matrix of the lode.
Mill Run—A test of the value of a given quantity of ore.
Mine—An excavation in the earth from which mineral substances are dug.
Miners' Right—The license to locate, used in Australia.
Mining—In its broad sense embraces all that is concerned with the production of minerals and their complete utilization.
Mispickel—Iron pyrite, containing arsenic.
Mortar—A receptacle for ore beneath the stamps of a stamp mill.
Moyle—A drill or short bar sharpened to a point, used in cutting hitches and in broaching. (Also Moil.)
Muffle—An oxidizing furnace.
Native — As applied in mineralogy, means metal found pure, or refined by nature.
Nitro—A corrupted abbreviation for nitroglycerine or dynamite.
Noble Metals — Gold, silver, mercury and platinum.
Nodule—A rounded mass of irregular shape.
Nugget—Any lump of native metal.
Operator—One who works a mine either as owner or lessee.
Open Cut—A surface working without a covering.
Ores—Compound of metals with oxygen, sulphur, etc.
Ore—The mechanical or chemical compounds of the metals with baser substances. The conventional designations in the ore market are: Dry Ore, an ore which does not contain any lead, or less than 5 per cent; Milling Ore, a dry ore that can be amalgamated or treated by leaching or other processes; usually these ores are low-grades, free, or nearly so, from base metals; Shipping Ore, such as is better adapted to smelting than any local treatment; any ore of greater value when broken less the cost of freight and treatment; Refractory Ore, an ore containing in quantities zinc, arsenic, antimony or other base metals, which prevent economical treatment by usual and available processes.
Ore Reserves—The ore body where exposed ready for stoping.
Ore Shute—A large and unusually rich aggregation of mineral in a vein. Distinguished from pay streak in that it is a more or less vertical zone or chimney of rich vein matter extending from wall to wall, and having a definite width laterally.
Ounce—Used to designate the ounces of pure gold or silver to the ton of ore.
Outcrop—The portion of a vein showing at the surface.
Outlier—Any portion of a group of rocks, lying in a detached position, or out from the main body.
Outlet—An exit passage from the mine.
Output—The product of a mine.
Oxide—A compound of oxygen with other elements.
Oxidation—A chemical union with oxygen.
Ore Zone—A large deposit of ores or minerals in place.
Pan—A hard stratum of earth; a broad, shallow vessel used for washing auriferous gravel.
Panning—The act of separating gold from gangue or gravel by washing.
Parting—A joint in the rock, or a crevice in a seam, filled with clay or slate; a thin stratum or layer which separates two formations. Also called a Selvage.
Patch—A small placer claim.
Patio—A yard or court; the space where ore is mixed and amalgamated by tread of horses. (Spanish.)
Patio Process—The Mexican method of amalgamation of silver ores.
Pay—Profitable ore.
Pay Streak—The richest streak in the vein.
Pay Rock—The lode material in which the mineral or pay is found.
Phonolite—A greyish, compact, felspathic rock yielding a metallic sound after the hammer; clinkstone.
Phosphates—Prehistoric acid combinations.
Pinch—Contraction of the vein.
Pipe—An elongated body of mineral, generally in a horizontal plane.
Pitch—The slope or dip of a vein.
Placer—A deposit of gold or other mineral found in particles in alluvium or diluvium.
Plat—A small chamber on the side or sole of a level where it intersects a shaft, made to facilitate dumping. Where it is cut in the sole it is called a trip-plat. (Cor.) A platform for sorting ore.
Pocket—A rich spot in a vein or deposit.
Pockety—A term applied to a mine where the pay ore occurs in small detached bodies with intervals of poor ore or barren material. The word implies a slur on the mine.
Poling—The process of timbering by the use of poles, for timbering in soft ground.
Poppet, also Puppet—A pulley frame or the head gear over a shaft. A valve which lifts bodily from its seat instead of being hinged.
Porphyry—A general term including such plutonic rocks as exhibit well formed crystals, usually of feldspar, in a finely granular or compact base of the same. (Ger.)
Porphyritic Granite.—A base of granite containing prominent crystals of feldspar.
Power Drill—A rock drill employing steam, air, or electricity as a motor.
Prill—A good sized piece of pure ore.
Prop—A piece of timber or metal placed normally to the roof or wall for its support.
Prospect—The name given to underground workings, the value of which has not yet been made manifest. A prospect is to a mine what mineral is to ore.
Prospecting—Searching for mineral veins.
Pulp—Finely pulverized ore.
Pulverize—To reduce to powder or dust.
Pumice—A light, porous lava.
Pyrites—(White) A sulphide of iron. (Yellow) A sulphide of copper. A bright, crystalized, metallic-looking and very common gold-bearing ore, usually low grade and spoken of in common parlance as the "Iron." (Ger.)

Scientific Progress.

Compressed Air for Street Cars.

The use of compressed air as a street railway car motor is receiving present experimental trial in Chicago, Ill. There are two engines, each cylinder is seven inches in diameter, fourteen-inch stroke, one on each side beneath the car floor. The wheels are twenty-six inches in diameter, connected outside; the connecting bar is attached to the crosshead from above. The compressed air is contained in sixteen steel reservoirs, tubes of nine inches in diameter with an aggregate capacity of five cubic feet each. They are from sixteen to twenty feet long, are hung underneath the body of the car, two being inside under the seats. There is a throttle lever, reversing lever and air brake valve in compact form at each end of the car. Fully equipped with the motor the car weighs 18,000 pounds. Under the middle of the car is a cylinder seven feet long, eighteen inches in diameter, half full of water. In preparing a car for service it is run alongside storage tanks and the reservoirs charged through flexible connections. At the same time a steam pipe is connected with the water cylinder under the car, and steam forced through the water until the temperature is about 300 degrees. The motorman then opens the throttle and air from the reservoir is passed through a pressure regulator, where it is reduced to working pressure of about 150 pounds. From the regulator it is led by pipes to the hot tank, where it is forced through the water to give it warmth and moisture. It is a well-known fact that where a compressed gas is permitted to expand quickly heat is so rapidly absorbed from the surrounding air that a very low temperature is produced. In engineering operations where compressed air is used the pipes conveying the expanded air are covered with a thick frost. It is to prevent the freezing up of the motor—a difficulty that has existed in previous machines—that the air is passed through the heater. From the heater it goes to the engines, where it operates precisely as steam would do. The exhaust is noiseless. One charging of the reservoirs will run an ordinary car seventeen miles, while the pressure in the reservoirs will have been reduced from 2,000 to 140, and the temperature of the heater from 300 degrees to 180 degrees. In practice storage reservoirs and steam heaters are located at points along the line where the cars may be recharged as necessary.

ASTRONOMERS are already preparing for the next great shower of Leonids, or November meteors. These showers, which are among the most impressive phenomena exhibited by nature to man, are due to the crossing of the earth's path of a stream of minute bodies—probably pebbles not exceeding an ounce or two in weight, and spaced a mile or two apart in the densest portion of the swarm—which complete a revolution in their orbit in about 33¼ years. The meteors cross the earth's orbit at the point reached by our planet on the 12th or 13th of November, being next due at the place where the orbits intersect in November, 1899, or November, 1900. As the stream is immensely long, the earth will probably pass through the dense part of it on both years, and may encounter scattered members of the group on one or two years preceding and following those named. The thickness of the stream seems to be about 100,000 miles, but the earth, passing obliquely through it, is exposed to the meteoric downpour for about four or five hours. The meteors are traveling in the wake of Tempel's comet, which Leverrier thought was brought into our system in the year of 126 of our era. That this system is comparatively new is proven by the fact that it extends over not more than a tenth of its orbit, while the August meteors, which appear every year, have become quite evenly scattered over their entire orbit. Among other suggestions for studying the Leonids, Dr. Johnstone Stoney recommends attempts to photograph the swarm, both at the time when the earth is passing through it and while it is still in outer space. The swarm will be invisible to the eye, except as the particles are burned in our atmosphere, but may impress a long-exposed sensitive plate. Data that may serve in tracing a very remarkable past history may be gained also by noting the time when the earth encounters the most advanced of the meteors—possibly this year—and the hours when the showers seem to begin to reach their height, and to pass off. Any person who, about the middle of next November, witnesses a display of shooting stars from the constellation of Leo may aid astronomy by recording exactly what he sees.

WHEN there have been explosions in mines, due to the presence of inflammable gases, there result other gases which exert an unwholesome, if not positively fatal, influence on human life. In one certain instance, mentioned in a recent scientific report, fifty-two deaths resulted in this indirect way, and five directly, from the explosion. Hitherto, the after-damp, or gas produced by the ignition of fire-damp in mines, has been believed to consist essentially of corbon dioxide, or a combination of carbon and oxygen in the proportion of one atom of the former to two of the latter. But in the case just mentioned, carbon monoxide (which contains only half as much oxygen) played a conspicuous part. The lips, skin and mucous membrane, through which the color of the blood was visible, were of a much brighter red than is observed when death results from other causes. It was suspected that this was due to the presence of carbon monoxide, and subsequent tests verified the suspicion. The coloring matter of the blood contained no less than 79 per cent of this gas. It was thus ascertained for the first time just what percentage of saturation with this particular gas produced death. The report which contains this information calls fresh attention to the fact that the flame of a miner's lamp, which gives indications of the presence of carbon dioxide, does not reveal the existence of carbon monoxide.

THE curious colors of aluminum alloys have been investigated by Dr. Charles Margot. The alloys of white metals are usually white, but an alloy of 78 parts of gold and 22 of aluminum is brilliant purple, and one of 72 parts of platinum and 28 of aluminum is bright yellow. In these cases there seems to be true chemical combination. The structure is crystalline, and the alloys fall to powder when lightly struck, this property making them unfit for use in coinage and for other purposes.

AT the recent meeting of the Royal Society in London, a pendulum instrument was exhibited, intended to record the slightest tilts and pulsations of the crust of the earth. It was asserted that this instrument would render observable a tilt of less than one three-hundredth of a second of arc. In other words, if a plane surface were tipped up only so little that the rise would amount to a single inch in a thousand miles, the instrument would reveal the tilting.

AN aluminum quadrant has been devised to measure the actinic power of the Rontgen rays. The aluminum is arranged in concentric layers ranging from one to ten millimeters in thickness. Measurements are taken by holding the quadrant between an excited Crookes tube and a phosphorescent screen or a sensitized plate.

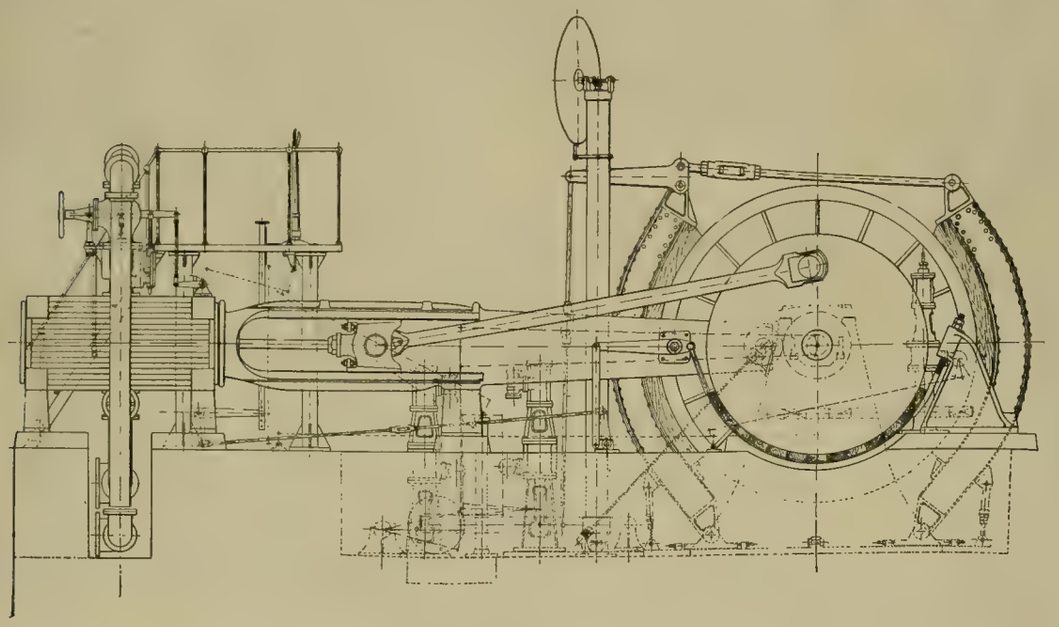
Mechanical Progress.

The Power Plant at the Corral Hollow Coal Mines.

Written for the MINING AND SCIENTIFIC PRESS by E. A. RIX, M. E.

The Rix Compressed Air Machinery Co., of this city, have for the past six months been engaged in installing a 1000 H. P. steam plant for the coal mines of the San Francisco and San Joaquin Coal Co., situated at Corral Hollow. The steam is furnished by six 72x16 standard horizontal tubular boilers, operated under a forced draught. The forced draught is supplied by two steam actuated Sturtevant fans, working through a 26-inch brick conduit. All the clinkers and ashes are removed from the furnace by means of a continuous system of conveyers, taken into independent bunkers and then carried away from the mine by cars.

The steam is carried through 11-inch tubing, about 500 feet, to the direct connected hoist, which is illustrated in this article. This hoist is of the Corliss type, direct connected, its engines having 20-inch diameter cylinders by 60-inch stroke. There are two reels, each 7 feet in diameter, carrying about 2000 feet of 1⅛-inch patent steel cable.



DIRECT CONNECTED HOIST AT THE CORRAL HOLLOW COAL MINES.

All the clutches, links, brakes, etc., are operated by steam cylinders with cataracts, which are under perfect control of the man who stands upon the elevated platform.

This hoist is heavy in design, weighing a little over 100 tons, and is calculated to hoist a load of 20,000 pounds 1500 feet per minute.

The cages connected to the cable of this hoist are rather unique affairs, being really conveyers rather than cages. The cage is about 30 feet long and runs on an independent outside track in the shaft, which is on an incline of 56°.

Within the cage track is a track upon which run the coal cars. This system of tracks and the relation of the cars to the cage is such that the cars are drawn along the track and discharged at the surface automatically, without stopping the cage. This is a unique system and will give a maximum hoisting capacity to the plant. There is practically no water at the mine fit for use in the boilers, and therefore all the water used on the different engines is condensed in a surface condensing apparatus of a unique pattern. The condenser is not used for vacuum purposes at all, but merely for condensing the feed water. The water which comes from the mine is always available, and is very heavily charged with different minerals, which corrode and scale any kind of pipe very rapidly. The condenser is therefore constructed in such a manner that any tube of the condenser can be cleaned off while the condenser is in operation. It is practically a large, flat tray, about 100 feet long and 40 feet wide, covered with a gridiron of copper pipes, so that it is possible for a man to sweep off these pipes with a metal brush, at any time, thus keeping them clean and in good condition for condensing.

The engines for the hoist were manufactured by the St. Louis Iron and Machine Works, of St. Louis, Mo., and the balance of the work on the hoist was built by the Fulton Engineering and Shipbuilding Works, of San Francisco, for and under the supervision of the Rix Compressed Air Machinery Co.

San Francisco, July 31, '96.

A New Boat.

Mr. Apostoloff, a Russian electrical engineer now in England, claims to have made a boat that will transport people from England to America in twenty-eight hours. It is made of toughened steel, shaped like a fish, the tail comprising the rudder. Round the body of this cigar-shaped construction a helix completes twenty-eight turns. Within this outer casing there is another shell, so placed and weighted that it remains perfectly stationary while the two-thirds of the exterior form to which the helix is fixed revolves with great rapidity. Thus it will be seen that the ship screws instead of pushes its way through the water. A shaft runs longitudinally through the center of the boat, fixed at either end to those parts of the outer casting which do not revolve, and upon this rests the inner portion, including both the passenger accommodation and the machinery used in propelling the boat. The Plongeur, as it is called, is capable of either floating on the water, or remaining below the level of the sea for thirty-eight hours without returning to the surface. The inventor says his boat will travel under water at the rate of 120 knots an hour, and will cost £20,000. He has been maturing plans for the last seven years. In the naval warfare of the future the boat is likely to play an active part.

Casting German Silver.

To obtain solid casting without blisters it is necessary to use none but first-class material and to observe the greatest economy in smelting. The latter is generally accomplished in the following manner: First a layer of small pieces of copper is put into the crucible, then a layer of zinc, nickel and finally, pulverized coal. The final covering is formed by a layer of copper and a heavy layer of coal. About one-half of the nickel and zinc to be melted should be retained and added in small portions after the mass has become liquid. The quicker the melting the less danger of absorption of oxygen and the formation of blisters is incurred. The metal retained should be added to the liquid material under continuous stirring with a wooden stick. In conclusion, says the *American Manufacturer*, some more coal is added and after it is burned and the ash has collected on top the mass is ready for casting, which should be accomplished at the proper temperature, neither too hot nor too cold. Molds and cores should be perfectly dry and none but sharp crystalline sand be used.

If it be true of fine wire, as stated in *Iron* and often set forth in print, then gold is by no means the highest metallic standard of industrial value. At a meeting of the South Staffordshire Institute of Iron and Steel Works Managers, Thomas Morris pointed out that the Warrington wire manufacturer who presented him with various specimens of workmanship in that line got $4.32 per pound or $8600 per ton for the article of drawn wire exhibited and so largely used in the construction of pianos and other musical and mechanical instruments. For pinion wire he got $2.16 per pound or $4,320 per ton. It took 754 hair springs to weigh an ounce of 437½ grains; it took 27,000,000 of them to weigh a ton, and taking one to be worth a cent and a half, the value of a ton of these apparently "cheap little things" runs up to over $400,000. The barbed instruments used by dentists for extracting nerves from the teeth were even more expensive, representing a rate of $2,150,000 per ton. A mile length of No. 19 size wire weighed only 21 pounds, and many of the ingots were 12 to 14 hundredweight each, and, after allowing for all the waste, only 50 miles of wire could be gotten from one ingot.

THE abandonment of profit sharing by so many firms in the United States leads *The National Labor Tribune* of Pittsburg to say: "The workmen ask a share in the business that is to yield them the fruits of prosperity without imposing any of the burdens of adversity. They would share gain but not loss. It is here that profit sharing fails. The system cannot be natural because it is not just. Like the handle on a jug, the benefit is all on one side. If the workmen consider themselves entitled to a financial interest in the firm they should be prepared to pay their pro rata assessment of loss as well as pocket their share of the gain The sliding scale system of wages, which the Amalgamated Association of Iron and Steel Workers favor, is recommended as a better one than the ordinary profit-sharing plan."

Electrical Progress.

Useful Electrical Force.

Electricity, light, heat and chemical action are all in essence motion; electricity is the most desirable of all of them, because it can most readily and fully become the source of issue of any other, says *Appleton*. The pre-eminent sensitiveness of electrical apparatus makes it a surpassing means of measuring minute portions of space or time, of light, heat, chemical activity or mechanical motion. Hence, a brood of tell-tales of widely contrasted purpose.

Selenium, a metalloid of the same lineage as sulphur and betraying its descent by a striking family resemblance, has the curious property of transmitting electricity more freely in light than in darkness; a stick of selenium, therefore, is the pivot of a device to give warning when extinction befalls a lamp charged with important duty. In thermometers a circuit broken or completed acts as a fire signal, or on shipboard heralds the approach of an iceberg.

Electric fingers sound a gong when the water recedes below the safety level in a steam boiler, or report an attempted breach of bolt or bar by the burglar's jimmy. Each of these warnings can be registered at a distance, so that in case of neglect by an attendant there can be no disputing the fact. Now, if an electric alarm can summon a servant to duty, why may not the inventor go further and so add to his device that it shall, of its own motion, do what needs to be done?

Accordingly, we find furnaces fitted up with electrical control, so that the draft is opened or fuel added when the temperature falls too low, or the reverse when the flame is too fierce. When the fuel is gas this stoking leaves nothing to be desired. New mechanism of this kind is constantly being conceived. The inventor who began by conferring electric nerves on muscles of brass and iron, has, thanks to electricity, gone the length of combining his wires and magnets into something very like a conscious and responsive brain. His intelligence culminates in duplicating itself.

In Kern Co., Cal.

Fifteen miles northeast of Bakersfield, Kern Co., Cal., the rapids of the Kern river furnish suitable force for the generation of electric power. The Power Development Co. of this city are now pushing a work that will cost $300,000 and furnish power for mining and other industries in that locality. In connection with what this paper has previously published concerning the work, it is worthy of present note that so far all the preliminary calculations and surveys have been found satisfactory and the actual work is rapidly progressing.

About two miles up the canyon from the site of the power house begins the flume that will carry the water. It is 8x6 feet, built on 4x6-inch sills and uprights, made of inch lumber, covered with felt and asphalt, and lined with half-inch redwood. It is 8574¾ feet long, devoid of angles, built on a grade of 6 feet to the mile, with 23 per cent curvature. It is calculated to carry 280 cubic feet of water per second, to be delivered at the power house to a steel pipe 540 feet long, 5½ feet diameter. The H. P. to be developed is figured at 7500.

A New Telephone System.

The new switchboard of the telephone exchange at Worcester, Mass., is the first multiple ever constructed employing automatic signals. An operator is enabled to complete the work of making a connection for a subscriber whose call she answers, and the signals are so arranged that she has constant knowledge of the several connections under her charge. It is not necessary for the operator to listen into the line to determine whether a subscriber has answered his bell nor to find out

whether or not he has finished talking, for all this and more is shown her by the lamp signals placed upon the keyboard. When the subscriber removes his telephone from the hook, it lights a lamp upon the switchboard, which indicates that the operator must place a plug in a jack close beside a lighted lamp. The placing of this plug extinguishes the line lamp, and, on receiving the number wanted, the operator places the second plug of the pair in the jack of the subscriber to be called, which lights a lamp on the keyboard corresponding to that particular cord, which lamp remains lighted until the called-for subscriber removes his telephone from the hook. This lamp then goes out and the connection is allowed to remain until both lamps in this set of cords light. The operator understands by this that both subscribers have replaced their telephones on the hook, and her duty then is to take down the cords and plugs, which automatically extinguishes the lights.

NICOLA TESLA, electrical expert and engineer, was recently shown a published statement which was telegraphed from Buffalo to the effect that he had discovered a method for successfully transmitting electricity long distances, and when asked as to the truth of it, replied: "Yes; I did state that electricity can be transmitted long distances upon a commercial basis over a distance of at least 500 miles. I will stake my reputation and my life upon it. I only qualify it by adding that the amount of power transmitted must be quite considerable."

JARBOE & CROOKS, of this city, have paid $125,000 for a controlling interest in the Tuolumne Electric Light and Power Co., on the Tuolumne river, at Columbia Hill, Cal. The plant is being enlarged, and contracts have been made with the owners of the Rawhide, App and other large mines in that vicinity for light and power.

IN Japan, Jan. 1st, '96, there were thirty-one electric lighting companies, eight of which use water power and the others steam; the total number of incandescent lamps was 80,150, or, reduced to their equivalent in eight-candle power lamps, 138,327; the number of arc lamps, nearly all of which are of 1200-candle power, was 420.

AT Monterey the Monterey Power Co. has resumed work at Little Sur river, where power will be generated and transmitted twenty-three miles to Monterey and Pacific Grove.

W. V. LOCKWOOD, of this city, proposes to put in an electric lighting plant at Quincy, Plumas Co., Cal., if satisfactory arrangements can be made to get water for power.

THE Petaluma, Cal., Electric Light & Power Company propose to spend $40,000 this summer in further improvements.

Practical Information.

A Drop of Water.

The water which is now in the ocean and in the river has been many times in the sky. The history of a single drop taken out of a glass of water is really a romantic one. No traveller has ever accomplished such distances in his life. That particle may have reflected the palm trees of coral islands, and has caught the sun ray in the arch that spans a cloud clearing away from the valleys of Cumberland or California. It may have been carried by the Gulf Stream from the shores of Florida and Cuba, to be turned into a crystal of ice beside the precipices of Spitzbergen. It may have hovered over the streets of London, and have formed a part of the murky fog, and have glistened on the young grass blade of April in Irish fields. It has been lifted up to heaven and sailed in great wool-pack clouds across the sky, forming part of a cloud mountain echoing with thunder. It has hung in a fleecy veil many miles above the earth at the close of long seasons of still weather. It has dropped as fleecy snow in the high Sierras, has washed gold in Nevada Co., furnished electricity at Sacramento, glistened in the sunlight of San Francisco bay, raced through the Golden Gate, hissed in spray on the Farallones, or swept over the bow of a vessel rounding Cape Horn. It has descended many times over in showers to refresh the earth, and has sparkled and bubbled in mossy fountains in every country in Europe. And it has returned to its native skies having accomplished its purpose, to be stored once again with electricity to give it new life-producing qualities and equip it as heaven's messenger to earth once more.

AT 60 miles an hour the resistance of a train is four times as great as it is at 30 miles—that is, the fuel must be four times as great in the one case as it is in the other. But at 60 miles an hour this fuel must be exerted for a given distance in half the time that it is at 30 miles, so that the amount of power exerted and steam generated in a given period of time must be eight times as great at the faster speed. This means that the capacity of the boiler, cylinders, and the other parts must be greater with a corresponding addition to the weight of the machine. Obviously, therefore, if the weight per wheel, on account of the limit of weight that the rails will carry, is limited, we soon reach a point when the driving wheels and other parts can not be further enlarged, and then we reach the maximum of speed. The nice adjustment necessary of the various parts of these immense engines may be indicated by some figures as to the work performed by these parts when the locomotive is working at high speed. Take a passenger engine on any of the big railroads. At 60 miles an hour a driving wheel five and one-half feet in diameter revolves five times every second; now the reciprocating parts of each cylinder, including one piston, piston rod crosshead and connecting rod, weighing about 650 pounds, must move back and forth a distance equal to the stroke, usually two feet, every time the wheel revolves, or in a fifth of a second. It starts from a state of rest at the end of each stroke of the piston, and must acquire a velocity of 32 feet per second in one-twentieth of a second, and must be brought to a state of rest in the same period of time. A piston 18 inches in diameter has an area of 254½ square inches. Steam of 150 pounds pressure per square inch would, therefore, exert a force on the piston equal to 38,175 pounds. This force is applied alternately on each side of the piston 10 times a second.

ONE frequently hears of people dying from "over exertion." Continuous work rationally performed rarely causes death. It is the pace that kills. Laboring at high pressure for a short time, no matter how long a vacation may follow, is unnatural, and unless the person attempting it is in the first flush of manhood he never recovers what he has lost in his attempt to crowd a day's work into a comparatively few hours. "Wisely and slow, they stumble that run fast," is as practical an adage as when Shakespeare wrote it, in times when there was not so much hurry in life as there is at present. More can be accomplished in the end by quiet, persistent endeavor than by occasional spurts at lightning speed.

FOR centuries the finest colored turquoises have come from Persia, but these mines are now almost exhausted. New Mexico is now the principal source of supply, and the search for these stones has proven the most profitable gem mining in the United States. The total American sales from 1890 to the beginning of 1894 were $500,000. While much of the product is pale in color, a considerable quantity is of robin's-egg blue, equal to the finest Persian stones, and a single piece is reported to have sold for $4000.

Co-operative Gold Mining in Australia.

Written for the MINING AND SCIENTIFIC PRESS by R. W. WILSON.

A visitor to almost any one of the different gold fields in Australia is usually surprised at the activity that prevails in mining matters in the gold fields towns. Almost every one he meets has a direct interest in some one or other of the various mines in process of development. It is possible that California may benefit by a careful consideration of the Australian methods for the encouragement of gold mining, which during the past twenty years have done so much for that country. On almost any Australian gold field nearly every individual who is above the position of an ordinary laborer is almost forced by the custom of the country into becoming directly interested in some form or other in the main industry upon which his district is dependent. In this way the district works out its own development and by united and concerted action achieves results that in the aggregate are little short of colossal in proportion to the paucity of the population. In California quartz-mining localities the contrary is the rule. The population of the various towns along the great mother lode belt has grown up for the most upon wages paid by absentee mine owners and companies whose capital is derived from the outside and to whom the profits find their way, to the impoverishment of the district from which they are drawn. It is different in Australia, and this is how they manage it:

In nearly every mining town there is an open mining exchange—that is, open to the public—where any person can go and buy or sell shares in mining stock. These exchanges have their regular calls and are usually open in the evenings. On the local mining exchanges one can generally get fairly trustworthy information about any mine or mining claim in the district, and the quoted price of any particular mining stock is taken as about its value for trade purposes.

When a man secures what he himself believes to be a good mine, or prospect, with the assistance of a few of his neighbors he proceeds to incorporate it into a company for development purposes. The expense of doing this is trifling and it gives something to sell, in the shape of shares, to provide money for development purposes. When the share certificates are issued the first thing to be done is to make every one who may benefit by the working of the new mine take a reasonable amount of stock. In this way the storekeeper's account is provided for, the board bill of the hotel keeper is met, and it is no unusual thing for some portion of the miners' wages to be paid in the same manner. This method of procedure is often spoken of by visitors as the co-operative system of Australian mining. By Australians themselves it is called by no particular name. It has become so usual that it has ceased to excite comment and is regarded as just the ordinary way for a poor man to develop a quartz mine so as to get something out of it and not have to sell it at a sacrifice, as is too often the ill fortune of the prospector here.

Where the strong element of co-operation comes in is this, that the merchants, store keepers, hotel keepers and others who are forced by public opinion and the custom of the country to take shares become the best possible selling agents in distributing stock that shows merit, as vouched for by its quotations on the local exchanges. The trading classes have opportunities of distributing stock that do not come in the way of the ordinary miner, and it is in this respect that their services are specially valuable. When a drummer approaches a merchant on an Australian gold field with a view to getting an order, this is about what happens:

"All right," says the merchant, "I'll give you an order. Now, I suppose your firm is making 30 per cent on this order. I have to carry a lot of stocks here for my customers. You must help me out in the matter. I will pay your invoice when I get it—70 per cent in cash or the usual trade terms, and the balance which represents your profit, you must take out in shares of the Lucky Bill," or whatever happens to be the name of the mine.

Almost invariably the drummer, after consulting his house, will agree to take the firm's margin of profit in gold-mining stocks at the price of the day in the local exchange. He then goes upon his way and tells everybody how such and such a merchant, with whom his firm "has had dealings for years," had put him "on to a real good thing." In this way he becomes a first-class selling agent and by degrees the stock begins to find its way to Melbourne, Sydney, Brisbane, or others of the big jobbing centers. If the mine continues to show satisfactory progress and a considerable quantity of the shares reach these large centers, its office is usually shifted to the place where most shares are held, and it is often reincorporated for a much larger nominal capital. If it goes on prospering and becomes popular on one of the exchanges of the larger cities, it is pretty sure to find its way to London at a big figure eventually, and the first owner, if he has retained any portion of his original interest, is certain to do well out of it. The great gold fields of Charters Towers and Gympic in Queensland, where development work is exceptionally tedious and expensive, have been built up almost entirely upon this cooperative system of mining and, after passing through the local stages, have furnished the London stock market with some of the favorite gold mines of the English investor, greatly to the advantage of the colonial miner.

In some of the towns along the mother lode of California the Australian co-operative system might be put in force with advantage to all concerned. There are plenty of people in this State to-day perfectly willing to provide money to be spent honestly on development work, provided they are assured that their money will be spent legitimately and that no portion of it will fall into the hands of the middleman who has not earned it, nor go in payment to the owner who wishes to sell a mere prospect at the price of a developed mine. It is in these respects that the open exchanges in the smaller mining towns of Australia afford some degree of security and safety to the small investor in gold mining stocks.

Recent Additions to the Collection of the State Mining Bureau.

Heulandite (fine specimen)—J. Z. Davis.

Navive Soda—Rhodes' marsh, Nevada, J. Z. Davis.

Rubellite—Damarou's ranch, Mesa Grande, San Diego Co., Cal.

Rubellite (gem variety)—San Jacinto mountains, Riverside Co., Cal., Frank H. Jackson.

Basalt Column—Mt. St. Helena, Lake Co., Cal., E. Anderson.

Gold Quartz—Cardinal mine, Tuolumne Co., Cal., A. F. Trenschel.

Gold Quartz—Marguerite mine, Placer Co., Cal., F. Deetken, Supt., and sundry others.

Also just placed on exhibition 500 rock specimens taken along the line of the mother lode through Mariposa, Tuolumne, Calaveras and Amador counties by H. W. Fairbanks. These rocks are numbered to correspond with the article on the "Geology of the Mother Lode" in the tenth report of the State Mineralogist.

H. S. DURDEN, Curator.

A VIBRATING helmet for the cure of nervous headaches has been devised by a French physician. It is constructed of strips of steel, put in vibration by a small electromotor, which makes 600 turns a minute. The sensation, which is described as not unpleasant, produces drowsiness; the patient falls asleep under its influence, and awakes to find that the pain has ceased.

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

SISKIYOU COUNTY—Continued.

Name of Mine	Character of Mine	No. of Men Employed	Location	Name of Superintendent or Agent	Address
Collins Claim	Gold quartz.	2	2 m W of Oak Bar	D. Collins, Owner.	Oak Bar
Collins Claim	"	2	3 m W of Oak Bar	D Collins, Own	Oak Bar
Commodore	"	2	13 m NE of Scotts Bar	C. E. Humphrys, Own	Scotts Bar
China Creek	"	8	7 m E of Happy Camp	Lee & Silva, Own	S. F.
Classic Hill	"	3	1½ m N of Happy Camp	Jas. Camp, Own	Fort Jones
Carter Claim	"	4	6 m W of Cottage Grove	Norman Carter, Own	Cottage Grove
Deer Lodge	"		6 m S of Sawyers Bar	Smith & Everleth	Sawyers Bar
Daley Claim	"	2	1½ m S of Sawyers Bar	Hugh Daley	Sawyers Bar
Duodec	"	8	14 m NW of Yreka	C. E. Humphrys et al	Yreka
Doherty Claim	"	4	1½ m E of Forks Salmon	Dougherty Bros., Own	Forks of Salmon
Donovan Claim	"	2	5½ m E of Callahans	D. Donovan, Own	Callahans
Duncan	"	2	5 m E of Scotts Bar	John Duncan, Own	Scotts Bar
Doggett	"	4	2½ m E of Oak Bar	L. Doggett, Own	Oak Bar
Doolittle	"	2	15½ m NW of Oak Bar	Walter Doolittle, Own	Oak Bar
Doozle	"	3	5 m E of Walker	Peter Knudsen, Own	Walker
David Ledge	"		13 m NE of Scotts Bar	P. C. Lange, Own	Oak Bar
Double Eagle	"	2	13 m NE of Scotts Bar	H. Barton et al, Own	Oak Bar
Del Norte	"	4	1½ m E of Happy Camp	Pierson Bros., Own	S. F.
Douglass	"	2	14 m W of Happy Camp	J. W. Douglass, Own	Happy Camp
Dillon Hill	"	10	4 m W of Cottage Grove	Dillon Hill M.Co, Own (Chinese.)	Cottage Grove
Eastick Bros. Ditch	Water		Near Oro Fino	Eastick Bros	Oro Fino
Eastick Lower Ditch	"		Near Oro Fino	Eastick Bros	Oro Fino
Eastick Bros. Mine	Gold.	21	Near Oro Fino	Eastick Bros	Oro Fino
Espy M. Co	"	10	4 m N of Yreka	R. H. Espy	Yreka
Empire	"	13	20 m NW of Yreka	W. E. Steele	Yreka
Eli Ledge	"	3	4½ m W of Yreka	— Lanson, Own	Yreka
Extension of Siskiyou (form'ly Gt. Northern)	"		6¼ m NW of Yreka	A. Barnes et al, Own	Yreka
Evening Star	"		7 m E of Sawyers Bar	Ben Daggett	Black Bear P. O.
East Fork Ledge	"	2	5 m E of Callahans	Walker & Schneider, Own	Callahans
Enterprise	"	5	5 m W of Callahans	Fred Beaudry, Own	Callahans
Everill Claim	"	3	4 m W of Hamburg Bar	John H Everill, Own	Hamburg Bar
Elk Creek Bar	"	16	¼ m W of Happy Camp	Chinese Co	Happy Camp
Elliott Diggings	"	3	1½ m E of Cottage Grove	Elliott Bros	Cottage Grove
Finley	"	9	Sawyers Bar	S. L. Finley & Sons	Sawyers Bar
Fagunden	"	10to25	11 m N of Fort Jones	Manuel Lial & Co	Yreka
Frank Perry Mine	"	2	Hawkinsville	Frank Perry	Hawkinsville
Francis, J., Co. Claim	"	6	Hawkinsville	Joe Francis	Hawkinsville
Fraser Claim	"	2	3 m S of Sawyers Bar	Jas. Fraser	Sawyers Bar
Frank	"		Sawyers Bar	— Redding	Sawyers Bar
Flag	"	2	Sucker Creek	— McIntyre, Own	
Fabucinus & Rider	"	2	4 m S of Walkers P. O.	Fabucinus & Rider	Walkers P. O.
Falcon Claim	"	2	11 m N of Yreka	T. E. Williams	Yreka
Forks Claim	"	5	Forks of Salmon	W. P. Bennett	Salmon
Foley (form'ly Hayes)	"	8	5½ m W of Callahans	G. H. Hayes	Callahans
Fair	"	15	5½ m W of Callahans	J. D. Heard et al, Own	Callahans
Fort Gough Claim	"	10	5 m W of Seiad	Dean & Burns, Own	S. F.
Geo. Baker Claim	"	4	Near Fort Jones	Geo. Baker	Fort Jones
Green Mountain	"	3	Quartz Valley	Howard Lewis	Fort Jones
Gardner & Deming Claim	"		Oro Fino	S. R. Gerdner et al, O'n	Oro Fino
Gardner & Deming Ditch	Water		Near Oro Fino	Gardner & Deming	Oro Fino
Gardner & Deming	Hyd'l'c	7	Oro Fino	Gardner & Deming	Oro Fino
Gold Note	Gold.	4	6 m W of Henley	D. Horn	Henley
Golden & Eveleth	"	6	6 m E SE of Sawyers Bar	F. Golden & T. Eveleth	Sawyers Bar
Golden Ball	"	15	5 m S of Sawyers Bar	A. Ball	Sawyers Bar
Galena	"	2	N Fork of Humbug Creek	J. N. Coulson & N. E. Thrash.	
Gerkin Claim	"	2	7 m W of Cecilville	Geo. Gerkin	Cecilville
Gum Boot	"	4	9 m NE of Scotts Bar	C E Humphry et al, O'n	Scotts Bar
Goodenough	"	2	13 m NE of Scotts Bar	C E Humphry et al, O'n	Scotts Bar
Gausbey Claim	"		2½ m W of Oak Bar	A Gausbey, Own	Oak Bar
Gerhart	"	2	12 m NW of Oak Bar	J. Gerhart, Own	Oak Bar
Garrison Springs	Miner'l water.		15 m NE of Oak Bar	J. Garrison, Own	Oak Bar
Grider Claim	Gold.	3	1 m E of Seiad	W. T. Grider, Own	Seiad
Grider Claim	"	25	2 m W of Happy Camp	Chinese Co, Own	Happy Camp
Gardon Claim	"	6	5½ m E of Happy Camp	C. Gordon, Own	Happy Camp
Goodwin Claim	"	4	11 m W of Cottage Grove	Frank Goodwin, Own	Cottage Grove
Hock Co	"	10	Near Fort Jones	Hock Co	Fort Jones
Hook Him	"	6	Near Fort Jones	Hook Him Co. Chinese	Fort Jones
Hobochen	"	12	2½ m NE of Deadwood	H. J. Diggles	Fort Jones
Hardscrabble	"		Quartz Valley	E. Erno	Oro Fino
Hiyou	"	3	Deadwood	Louis Davis	Fort Jones
Hiyou Gulch	"		7 m N of Fort Jones	Est. of Mrs. Noah Williams.	Callahans
Hardscrabble	"	7	Near Fort Jones	Gee Wah Co	Etna
Hunter & Downey	"	5	5 m S of Siskiyou	H. Hunter & L. Downey.	Sawyers Bar
Hickey Claim	"	4	6 m W of Sawyers Bar	Frank Hickey	Sawyers Bar
Hickey Bros. Claim	"	4	2½ m W of Sawyers Bar	Hickey Bros	Sawyers Bar
Horse Creek	"	11	Oak Bar M. Dist	P. C. Lang et al, Own — Lane, Supt.	Yreka
Humbug Flume and Mining Co	Placer.	11	12 m NW of Yreka	Spengler Bros. et al, Own.	Yreka
Hugh Pugh & Co	"	4	W Fork of Humbug Creek	Hugh Pugh & Co	
Hegler	Gold quartz.	4	12 m NW of Yreka	Hegler & Aldrich	Yreka
Hungry Hill	"	26	8 m S of Forks of Salmon	A. Dammerbrink	Forks of Salmon
Harn Claim	"	2	Forks of Salmon	W. B. Bennett, Own	Salmon
Hansen Diggings	Placer.	2	4 m S of Somes Bar	W. H. Bonersox	Somes Bar
Hayslip Gulch	Gold quartz.	2	4 m E of Callahans	L. Schneider	Callahans
Huntington Claim	"	2	5½ m E of Callahans	J. Huntington, Own	Callahans
Highland	"	8	14 m SW of Callahans	Fort & Co.; J. B. Fort, Supt.	Callahans
Hart	"	2	6 m W of Callahans	Chas. Hart, Own	Callahans
Heard & Henry	"	4	3½ m SW of Callahans	M. W. Loverage, Own	Callahans
H. & M	"	4	2 m SW of Callahans	Walker Bros. & Barr, Own.	Callahans
Hartstan	Gold quartz.		7 m S of Etna	G. W. Hartstan, Own	Etna
Hanrigan	"		½ m E of Hamburg Bar	H. Hanrigan, Own	Hamburg Bar
Hubbart Claim	"	2	14¼ m NW of Oak Bar	Jesse Hubbart, Own	Oak Bar
Harse Co. Claim	"	7	14 m NW of Oak Bar	P. C. Lange, Own	Oak Bar
Hubbart Claim	"	7	2 m E of Oak Bar	Jesse Hubbart, Own	Oak Bar
Hubbart Claim	"	2	14½ m NW of Oak Bar	W. H. Hubbart, Own	Oak Bar
Hubbart Claim	"	2	13 m NE of Scotts Bar	C. E. Humphrys, Own	Scotts Bar
Hadlieff Claim	"		10 m W of Happy Camp	M. Doolittle, Own	Happy Camp
Halstead Claim	"	6	10 m W of Happy Camp	M. Doolittle, Own	Happy Camp
Haley Claim	"	2	13 m N of Happy Camp	D. Huey, Own	Happy Camp
Huey Claim	"	3	12 m N of Happy Camp	S. E. Howard, Own	Happy Camp
Howard Claim	"	3	17 m W of Cottage Grove	A. Halvorson, Own	Cottage Grove
Halvorson Claim	"	3	15 m W of Cottage Grove	Chas. Hicox, Own	Cottage Grove
Hicox Claim	Gold.	1	8 m SW of Yreka	J. Irousides, Own	Yreka
Ironsides	"	2	6 m NW of Forks Salmon	Ayies & Dum, Own	Gilta P. O.
Indian Bar	"	5	15 m NE of Walker	J. T. Iuney, Own	Oak Bar
Iuney Claim	"	2	10 m W of Scotts Bar	C. E. Humphrys, Own	Scotts Bar
Insurance Claim	"	2	19 m W of Cottage Grove	Walter Ingham, Own	Cottage Grove
Ingham Claim	Drift.	12	Near Fort Jones	Hop Sing & Co	Fort Jones
Johnny Bull	Gold	2	Near Sawyers Bar	Dr H. E. Helm and H. J. Eldridge.	Sawyers Bar
Jumbo	quartz.		Hawkinsville	J. A. Furria	Hawkinsville
John Miller	Placer.	4	7 m NW of Yreka	— Lawson, Own	Yreka
Jehovah	Gold quartz.	1			
Jordan	"	2	1 m E of Summerville	Cyrus Jordan	Cecilville
Jacobs & McCarty	"	2	1 m S of Scotts Bar	D. McCarty, Own	Scotts Bar
Jackson Claim	"	2	4 m E of Walker	B. B. Jackson	Walker
Johnson Claim	"	4	16 m NW of Oak Bar	W. P. Johnson	Oak Bar
Junction Bar	"	12	2 m N of Scotts Bar	Fang Yick Co. Chinese	Oak Bar
Klein's Claim	Gold.	3	Sawyers Bar	W. E. Klein	Sawyers Bar
Kaper Claim	"	2	Sawyers Bar	G. A. Mohr	Sawyers Bar
Klamath	"		4 m S of Sawyers Bar	A. Ball	Sawyers Bar
Kee Hong Claim	"	22	Mouth of Humbug Creek	Chinese Co	
Kanaka	"		Humbug Creek		
Katie	"	4	6 m W of Yreka	M. Carrick	Yreka
Kum Nothing	"	2	8 m SE of Forks Salmon	W. P. Bennett, Own	Forks of Salmon

SISKIYOU COUNTY—Continued.

Name of Mine	Character of Mine	No. of Men Employed	Location	Name of Superintendent or Agent.	Address
Keffer Claim	Gold.	2	1¼ m W of Oak Bar	J. C. Keffer	Oak Bar
Klepper Claim	"	2	1½ m E of Walker	Wm Klepper	Walker
Luke Shaw	"	8	1½ m N of Fort Jones	Luke Shaw	Fort Jones
Little Queen (formerly Erno)	"	3	Quartz Valley	Elim Erno	Fort Jones
Last Chance (formerly Stewart's Claim)	"		7½ m N of Fort Jones	Geo. Thompkins	Fort Jones
Last Chance	"	2	Oro Fino	Richard Linsey	Oro Fino
Lewis Ledge	"	2	Oro Fino	Grant Lewis et al	Oro Fino
Liberty	"	2	4 m S of Sawyers Bar	Stevens, Grant & Hughes.	Sawyers Bar
Little Wanderer	"	1	10 m SW of Yreka	J. Irousides, Owner	Yreka
Lime Point	"			H. Boucher	
Lime Gulch	"	12	11 m NW of Yreka	Chinese Co	Yreka
Lucky Bob	"	2	Gottville	Freshour Bros	Gottville
Lee Han River M. Co	"	50	Gottville	Lee Han & Co	Gottville
Lima	"		5 m W of Yreka	— Lawson, Own	Yreka
Little Wanderer	"	1	12 m SW of Yreka	J. Irousides, Own	Yreka
Lucky John	"	2	N Fork of Humbug Creek	T. E. Williams and Jno. Martin.	Yreka
Low Hill	"	5	1 m E of Summerville	Dr. J. H. King et al, Own	Fruit Vale (Humboldt Co.)
Last Chance	"	2	6 m SE of Forks Salmon.	Wagner & Campbell, Own.	Sawyers Bar
Lucky Bar (formerly Baldwin's)	"		1 m W of Callahans	J. D. Heard, Own	Callahans
Last Chance	Gold quartz.		Callahans	A. H. Denny, Own	Callahans
Littlefield	"	2	1½ m W of Callahans	W. Littlefield, Own	Callahans
Lange	"	4	4 m E of Walker	Lange Bros., Own	Oak Bar
Landen Claim	"	3	2 m W of Hamburg Bar	J. S. Landen Jr., Own	Hamburg Bar
Lane Claim	"	7	3 m W of Hamburg Bar	D. Lane, Own	Hamburg Bar
Landen Claim	"	4	8 m W of Hamburg Bar	J. S. Landen Sr., Own	Hamburg Bar
Lee Yet Bar	"	20	8 m W of Hamburg Bar	Lee Yet Co., Chinese	Seiad
Lee Claim	"	2	7 m E of Happy Valley	Lee & Co	Happy Camp
Last Venture	"	6	9 m W of Happy Camp	M. Doolittle	Happy Camp
Miller Ledge	"		Near Oro Fino	Wm. Ray & Wm. Egly	Oro Fino
Moore Claim	"	2	3½ m E of Sawyers Bar	Thos. Moore	Sawyers Bar
Maloney	"	2	Sawyers Bar	Wm. Maloney	Sawyers Bar
Myers & Smith	"	3	Sawyers Bar	Myers & Smith	Sawyers Bar
Metropolitan	"		4½ m SE of Sawyers Bar	Parker & Sons	Etna
Magnitude	"		5 m W of Yreka	— Lawson, Own	Yreka
Mint	"	2	Yreka	E. Herr & Co., Own	Yreka
Miller's Claim	"	2	Near Summerville	J. B. Miller, Own	Cecilville
Missionary Bar	"	2	2 m SE of Forks Salmon	W. P. Bennett, Own	Forks of Salmon
Manter's Mine	"		5 m SE of Somes Bar	Abandoned	
Millich Claim	"	2	4 m NW of Forks Salmon	P. Millich, Own	Forks of Salmon
Mount Bolivar	"	2	5 m SW of Callahans	Geo. W. Smith, Own	Callahans
Montezuma	Gold.	30	At Callahans	Hop Yick & Co., Own	Callahans
Mabel	"	2	9 m NE of Scotts Bar	W. A. Chamberlain et al, Own.	Yreka
Milne Claims	"	4	Scotts Bar		
Mart. Andrews Claim	"		1¼ m N of Scotts Bar		
Maplesden & Sons	"	7	Hamburg Bar	Maplesden & Sons, O'n	Hamburg Bar
Mott Claim	"	2	¼ m E of Oak Bar	C. Mott	Oak Bar
Musgrave	"	2	5½ m E of Walker	Mark Musgrave, Own	Walker
Morning Star	"	2	13 m NE of Scotts Bar	Jas. Wright, Own	Walker
Martin Andrews	"	20	1 m E of Hamburg Bar	Martin Andrews, O'n	Hamburg Bar
Meyers Claim	"		½ m W of Hamburg Bar	Wm. F. Meyers, Own	Hamburg Bar
Maplesden Bros	"	5	3 m W of Hamburg Bar	Maplesden Bros, Own	Hamburg Bar
Mountain Sprocket	"	3	10½ m W of Happy Camp	M. Doolittle, Own	Happy Camp
Muck-a-Muck	"	6	1½ m E of Happy Camp	Mrs. W. B. Reeves, O'n	Happy Camp
Morgan Point	"		6 m E of Happy Camp	M. Doolittle, Own	Happy Camp
Miller Claim	"	3	5 m SW of Callahans	J. W. Miller	Callahans
McCann	Gold quartz.	1	7 m NW of Yreka	Jas. Mann	Yreka
McNeal's Claim	"	4	Near Forks of Salmon	Geo. McNeal	Forks of Salmon
McMahon	"	2	3 m SW of Callahans	Wm. McMahon	Callahans
McGuffy Bros	"	3	Scotts Bar	G. McGuffy et al, Own	Scotts Bar
McCauley	"	3	1 m N of Scotts Bar	Jas. McCauley, Own	Scotts Bar
McCrary	"	4	½ m E of Hamburg Bar	McCrary & Maplesden, Own.	Hamburg Bar
New York	Gold.		Hooperville	E. W. Mills	Fort Jones
Nicolett	"		4 m S of Sawyers Bar	Chas. Nicolett	Sawyers Bar
Nicolett Claim	Drift.	2	Sawyers Bar	Chas. Nicolett	Sawyers Bar
Ninety (Fly Hibernia)	Gold quartz.	5	Sawyers Bar	J. W. Murray	Sawyers Bar
Nebraska	Gold.	2	10 m SW of Yreka	H. Mack, Own	Yreka
Nelson	"	1	12 m NW of Yreka	Haggin & Hearst; (formerly Del Monte.)	S. F.
Nigger Hill	"		2½ m SE of Forks Salmon	W. P. Bennett, Own	Forks of Salmon
Nolan	"	2	8 m SW of Callahans	Ed. Nolan, Own	Callahans
Nesbit & Hunt Claim	"	2	Scotts Bar	Nesbit & Hunt, Own	Scotts Bar
N.Y. Placer M. Co	"	15	13 m SE of Callahans	H. V. Carter, Own	Callahans
Nolan's Bar	"	2	1 m W of Cottage Grove	Wm. Thomas, Own	Cottage Grove
Olive	Gold quartz.		7 m N of Fort Jones	W. C. Doane	S. F.
Oro Fino S. Mill			Oro Fino	Jno. T. Moxley	Etna
Old Hundred	Gold quartz.		Hooperville	B. M. Hammock	Fort Jones
Oak Grove	"		4½ m N of Fort Jones	Theo. Lincoln	Fort Jones
Oregonian	"	13	4 m N of Sawyers Bar	A. R. Campbell et al	Sawyers Bar
Osceola	"	3	6 m S of Sawyers Bar	F. D. Mauckton	S. F.
Ork	"		6 m W of Sawyers Bar	Frank Hickey	Sawyers Bar
Ohio	"		7 m NW of Yreka	— Lawson	Yreka
Only Hope	"	2	14 m NW of Yreka	D N. Lash	Yreka
Oro Grande	"	2	Middle Fork Humbug C'k	J. N. Coulson and A. E. Thrash.	Yreka
Old Vet & Eclipse	"	2	9 m NW of Yreka	Hossick & Brown, O'n	Yreka
Olsen Claim	"	3	9 m W of Sawyers Bar	Fred Olsen	Sawyers Bar
Officle	"	3	Hamburg Bar	W. P. Officle	Hamburg Bar
Oak Flat	"	12	8 m W of Happy Camp	Coan Co	Happy Camp
Pinkham	Gold.	2	Quartz Valley	Geo. Buchner	Oro Fino
Pitz	"	2	Oro Fino	John Pitz	Oro Fino
Portuguese Claim	"	3	8 m NE of Sawyers Bar	Antone Joseph	Oro Fino
Peters	"	2	6 m S of Sawyers Bar	Peters Bros	Sawyers Bar
Paymaster	"	3	4 m S of Sawyers Bar	Jas. Patterson and Edgar Wallace.	Sawyers Bar
Pacific River Claim	"		Near Mouth Humbug C'k	Dr. Sougers	Yreka
Punch Creek	"	2	5 m NW of Yreka	J. C. Burgen and D. McCook, Own.	Yreka
Parker's Claim	"	4	9 m below Cecilville	Parker & Sons, Own	Etna
Preckel Claim	"	2	Scotts Bar	H. Preckel, Own	Scotts Bar
Poverty Bar	Paint.	2	Oak Bar	H. J. Barton, Own	Oak Bar
Pedebedne	Gold.	3	½ m from Scotts Bar	Joe Pedebedne, Own	Scotts Bar
Portuguese Bar	"	6	12 m W of Seiad	Jas. Camp, Own	Fort Jones
Phillips Bros. Claim	"	4	5 m N of Seiad	Phillips Bros., Own	Seiad
Penny	"	2	8 m W of Cottage Grove	Henry Penny, Own	Cottage Grove
Quinn's Elec. Wks, &c.	"	4	4 m N of Yreka	— Quinn, Own	Yreka
Queen	Gold.	2	10 m SW of Yreka	D. Barnes	Yreka
Quinn McConnell	"	44	12 m NW of Yreka	Dr. Sougers	Yreka
Queen	"	2	12 m SW of Yreka	D. Barnes, Own	Yreka
Quartz Hill	"	9	Scotts Bar	J. Goldberg et al, Own	Scotts Bar
Quartz Gulch	"	2	1½ m E of Happy Camp	David Lane, Own	Happy Camp
Reliable & Extension	"		On Hungry Creek	J. L. Coyle	
Red Hill	"	2	Sawyers Bar	A. Ahlgren	Sawyers Bar
Roberts	"	2	4 m S of Sawyers Bar	Eddy Roberts	Sawyers Bar
Ruif Claim	"	2	2 m NW of Cecilville	Chas. Ruff	Cecilville
Rhinehold	"	2	SE of Cecilville	J. J. Rhinehold	Cecilville
Red Hill	"	14	2 m SE of Forks Salmon	Parker & Sons	Etna
Rycraft Claim	"	2	8½ m SW of Callahans	S. Rycraft, Own	Callahans
Ront	"		7 m S of Etna	Chas. Ront	Etna
Roche	"	3	Callahans	E. Roche, Own	Callahans
Robinson	"	2	5½ m E of Scotts Bar	J. Robinson, Own	Scotts Bar
Robertson	"	12	15¼ m NW of Oak Bar	Chinese Co., Own	Oak Bar
Rider	"	2	4½ m E of Walker	White & Rider, Own	Walker
Rider & Fabristino	"	2	4½ m E of Walker	Rider & Fabristino, Own.	Walker
Ramus	"	2	1½ m N of Scotts Bar	Joe Ramus, Own	Scotts Bar
Ramus	"	3	1¾ m W of Hamburg Bar	Chas. Ramus, Own	Hamburg Bar
Runnels Co	"	5	23 m W of Cottage Grove	Wm. Lord, Own	Orleans Bar
Rock Creek	"	4	8 m W of Cottage Grove	Frank Hostetter, Own	Cottage Grove
Red Hill	"	4	23 m W of Cottage Grove	Wm. Lord, Own	Orleans Bar
Stewart's Mine	"	3	7 m N of Fort Jones	J. Moore & Luke Shaw	Fort Jones
Sunshine	"	3	Quartz Valley	E. Erno	Oro Fino
Steel	"	2	Quartz Valley	Chas. Sargent	Fort Jones
St. Lawrence	"		Quartz Valley	A. S. Meyers	Fort Jones
Shackelford	"		Quartz Valley	Chas. Roberts	Etna
Shell's Claim	"	2	Quartz Valley	W. Shell, Own	Fort Jones
Star's Claim	"	2	Quartz Valley	David Star, Own	Oro Fino
Stockton	"		Quartz Valley	H. Radbruck	Fort Jones

*Begun in issue of April 25, '96.

(To Be Continued.)

Mining Summary.

CALIFORNIA.

Amador.

The Bay State mine, four miles north of Plymouth, is down 750 feet. A crosscut to the east is being made.

The Live Oak mine at Volcano is bonded by W. McVey of Berkeley from A. W. Robinson.

J. Treadwell of San Francisco, principal owner of the Corral Hollow coal mines, is treating for the Mitchell mine, near Pine Grove.

Republican: The Fogus mine, on Sutter creek, one mile below Volcano, will be reopened soon and operations, employing a considerable force of men, will be resumed.

At the Oneida mine the shaft is down 350 feet. Eighteen men are employed sinking, making about 10 feet a month. The rock is very hard.

The owners of the Thorp mine will put in a 46-stamp mill as soon as they can arrange for power. The mine is down 500 feet and still sinking.

Butte.

The Debris Commissioners have granted permits to use hydraulic pipes at Cherokee in washing the gravel on the bedrock, but no new ground is to be touched.

The Spring Valley Gold Mining Co. also furnishes the water for the power that runs the Pershbacker mine, Magalia. J. B. Whitcomb is receiver. The gold is washed out of the cement next to the bedrock. The big dam on the company's ground is in good order. There are five mining derricks on this claim. Four Portuguese companies own four of them, and pay a royalty to the receiver.

Calaveras.

At the Gwin mine the shaft is down 1350 feet. Cutting the station at the 1300 level is begun. A crosscut will be run to the ledge. Another level will be opened up at 1400 feet. The 40-stamp mill will be built this fall.

Supt. Ryland has shut down the Ryland mill, near Altaville, for a few months and is going to sinking.

The Gold Cliff mine, belonging to the Utica Co., has been shut down for a month on account of a scarcity of water.

W. A. Clary, former superintendent of the Sheep Ranch mine, has bonded the Fred Broomer mine, located a mile and a half east of Angels.

Citizen: The Hedrick mine has resumed this week, after a suspension of several days. The Dower gravel mine at Old Gulch will be reopened. The Rose Rock mine on Indian creek is to be worked under new management. It is reported that the Chaparral Hill mine, situated near Robinson's Ferry, has been recently bonded by E. K. Stevenot, the owner, to A. N. Butts of Salt Lake. There is a general revival in mining circles around Esmeralda. The machinery at the Esmeralda mine has been put in place. An additional force of men will be employed as soon as B. Montgomery arrives from Los Angeles. The Illich & Peirano mine, on Indian creek, is showing up well. A load of ore from this mine, taken from the bottom of the shaft, which is 75 feet deep, was run through the mill on the Cuneo mine last week. The test proved the ore to be worth $15 per ton. Salt Lake capital, under the management of Col. Woodrow, has been invested in the Peirano, situated about two and a half miles from Angels, on the Carson road. This company bonded the property for a year's time, at the expiration of which an extension of five months was granted. The developments, meeting with the expectations of the operators, resulted in the sale being consummated at San Andreas last Saturday.

El Dorado.

(Special Correspondence).—The Salisbury Company are adding additional machinery for pumping facilities to their power plant and using a rock drill in their shaft work. The new shaft is down 90 feet in solid ore.

Wm. Burton has bonded to L. M. Howe the Buckeye quartz claim, eight miles north of Placerville. There are two shafts and a 50-foot tunnel and crosscut. Development work will at once be resumed.

The Gold Note and Philadelphia, seventy-five miles east of here, are asking for bids to sink 200 feet additional to the 145-foot shaft, in which they have a good grade of ore. The ledge is said to be 7 feet.

The tunnel on the old Red Hill property has reached 425 feet on a 7-foot ledge that is black with sulphurets. This property is in the Kelsey district and is owned by parties in Scranton, Pennsylvania.

The London people developing the Richmond mines, fifteen miles west of here, are building a station on the 100-foot level.

The Davidson mine, seven miles west of here, which was a good producer, but destroyed ten years ago by fire, is about to be reopened. It was recently purchased by a New York party for $6000.

N. D. Burlingham has sold the old Esperanza properties, situated twelve miles north, to Mrs. Salina Lightfoot of Chester, England. There are three claims in the group and an old 5-stamp mill. The consideration is $150,000. The ledge at 200 feet is said to be 64 feet wide. The ore assays $5.75 per ton.

Placerville, Cal., Aug. 4, '96.

Fresno.

Republican: After ten years of development work the copper mine near Fancher creek, about thirty miles northeast of Fresno, is now about to be worked on a large scale by a company that has it bonded. Tunnels have been run and shafts sunk, and that there is a large body of excellent ore is no longer a matter of doubt. The advance in the price of copper has added greatly to the value of the property. It is probable that smelters will be built near the mine for the reduction of the ore. Some years ago ore from this mine was shipped around Cape Horn to Baltimore, where it was smelted, and the business paid until copper fell below 10 cents a pound. It is now about 11 cents, and it certainly should pay if the ore can be reduced at the mouth of the mine.

Inyo.

The Confidence mine and mill is still closed down. The property is in the Amargosa range, in the southern part of Death valley. It is owned by Cannon & Langford, of Salt Lake, Utah, who also own the noted Johnnie and Chispa mines at Montgomery, Nye county, Nevada. These properties are also idle. The proposed new postoffice at Resting Springs, to be called Amargosa, which was petitioned for by all Federal and county officers along the line and strongly recommended by all California Senators and Congressmen, has not been established. Nevada has two postoffices over there—Pahrump and Manse, connecting with Daggett—only seven miles apart, but all Southeastern Inyo has none. An extension of only thirty-three miles would place the borax and mining interest of that region in communication with the rest of the county in which they are situated.

Kern.

Lattin and Defrance have $500 in gold which they have taken out by dry washer process during the month of June. Owing to the intense heat they were unable to work only in the morning and evening. A great deal of the gravel will run $1.50 to the pan; from six hoppers they realized $47.60. A hopper of sand will weigh about seventy-five pounds. The great drawback to mining in the new district is the lack of water, but this difficulty will be overcome in the near future. Wells are now being sunk with fair prospects of getting good water. Where water has been obtained it is so strongly impregnated with magnesia that it cannot be used.

Merced.

Talking of the Merced property the Boston *News Bureau* says: "The unanswered problem in respect to the Merced gold mining property is how several hundred assays could show a capacity to pay $1,000,000 a year in dividends on Merced stock, or $10 per share, and present operations fail to reveal paying ore in any quantity. This is a mystery which we understand has not yet been solved by the Sears building people. The larger part of the $2 called upon Merced has been paid in and within a reasonable time the unpaid calls, together with the interest, will be asked for and later the remaining $3 per share may be invited." There is no intention whatsoever of abandoning the Merced property. It is regarded as one of the valuable properties of the mother lode, and sinking to the 1000-foot level will go steadily forward. It is no longer a question of milling operation; it is a question of finding profitable ore bodies.

Mono.

The superintendent of the Bodie Con. reports: During the week ending August 2nd east crosscut 1 from the main north drift, 200 level, was extended 14 feet, passing through small seams of quartz. The face is in soft porphyry. Upraise from east crosscut, 300 level, was extended 30 feet. There is a small seam of low-grade quartz about 10 inches wide in the top of the raise. The winze below the 550 level was sunk 5 feet. There is a small seam of ore in the bottom of the winze. Will start to drift north through the fault from the bottom of the winze. They have taken out and hoisted during the week six cars of ore from the old fillings in the Gildea stope, 200 level, estimated value $20 per ton.

Nevada.

The Shasta Mining Co. are advertising for bids to run 700 feet of tunnel in the California mine at Graniteville.

Pascoe and Maxwell of Silverton, Colorado, are at Meadow Lake. They expect to develop the Oro Fino quartz mine, which they purchased last year for $3000.

The Omaha Mining Company has bought the Homeward Bound Mining Company's claims adjoining the Omaha.

Placer.

The Red Dog Mining Company at You Bet, eight miles north of Colfax, have their new hoisting works in place and are running an incline on the channel at Missouri canyon.

Heath & Doolittle are developing their Lost Emigrant mine, sixteen miles from Cisco.

Plumas.

Geo. Maurer has taken a contract to build a debris dam for the Quincy Mining & Water Co., at Green Flat, the structure to be 245 feet long and 25 feet high.

At the Niagara Consolidated men have been put to work on the Bunker Hill and North American and are also engaged building a road to connect the two. It is the purpose of the company to work the North American next season both by hydraulic and drifting in the lower tunnel, while 40 men will be put to work in the Bunker Hill. Capt. Meikle is in charge.

Independent: Superintendent Schnabel of the Good Hope mine at Saw Pit Flat is cleaning up the season's work. The mine will probably shut down in another week till next season. In the meantime large additions will be made to their water supply. A new ditch will be dug in Onion Valley, an old one cleaned out and put in repair and the reservoir enlarged. It is expected next season to have ample water for a much longer run.

San Diego.

The Nectar mines, Picacho, San Diego county, have been bought by a Philadelphia syndicate. Development will immediately follow, and a large mill is to be added. Jesse E. Grant and ex-Senator Dorsey are owners of adjoining properties.

At the Golden Cross Mining & Milling Co. at Hedges for the week ending July 18th the work of pumping out the water from the Queen incline shaft, which was turned in to quench the fire in the old cave, progressed very much faster. It was at that date below the 400-foot level. The inclined shaft is not so badly caved below 400 feet as was feared, and the prospect is better to get the 500-foot level opened up. The supply of ore from this mine is from the 150 and 300-foot levels, and aggregates 100 to 120 cars per day. This ore runs about to $8 to $10.

The 300-level of the Cross mine is being opened as fast as circumstances will permit. The work is now being pushed by machine drills, as the station is opened far enough from the shaft to admit of the use of Burleighs without danger to the wall of the shaft. From 100 to 125 tons of ore per day are taken from this mine.

The Crown mine is doing well. The bonanza streak of 8 feet in thickness on the 300-foot level is opening out well and now shows a lateral extent of 70 feet. The same ore chute has been cut in the 200-foot level, and that level is now being opened up. The other two chutes of ore in this mine continue about the same. The incline is being sunk to the 400-foot level, and pipe is to be laid at once to convey compressed air to this mine so as to expedite the work. Burleighs will be at work there in two or three days. One hundred to 125 tons of high-grade ore is taken from this mine per day. The last cleanup, though the run was handicapped by many adverse things, was upwards of $20,000, or better than $1000 per day for the run.

Shasta.

(Special Correspondence.) — The Wallace, Graves and Rainbow mines, the property of Wallace & Saltzer of Redding, now bonded to Wm. Jackson, are located in Squaw Creek mining district, three miles west of Kennett R. R. station and nearly eighteen miles northwest of Redding. The ore body of this group of mines is base in character, carrying gold, silver and copper. The ledge runs to the north and south and dips to the west at an angle of about 45°. The walls are white porphyry, as are all others in this Iron mountain locality. The ore body, capped by gossan, that crops out for a distance of 1800 of the 4500 feet of the mine, is 70 feet thick between the walls. The present management have crosscut the ore body with three different tunnels, in about 100 feet each. They have about 400 tons of ore on the dump that, from an average of twenty-three different assays, will pay $10 in gold, $10.50 in silver and 4 per cent in copper per ton. A small amount of this ore can be milled, but the majority of it will have to be smelted. Free water and timber at hand.

The Balakiala Mining Co. has fourteen different claims. The principal work is eight tunnels, from 40 to 600 feet long, and three shafts, that have been sunk to from 24 to 90 feet. The ore bodies run northeast and southwest and dip to the southeast. The walls are porphyry and trachyte. The ledge matter is capped with a gossan casing. This mine is temporarily idle, awaiting machinery.

The Gray Fox mine, owned and managed by Wm. R. Conant, is 50 miles southwest of Redding, near the dividing line of Trinity and Shasta counties. This mine is 1500 feet in length, runs northeast and southwest and dips to the southeast, between walls of black slate. There is about 14 inches high-grade, free-milling ore, averaging about $50 gold and carrying about 1 per cent of sulphurets. This mine is being developed through three different tunnels, one above the other; the upper one is in 76 feet, the second 180 feet, the third 30 feet. There is an air shaft 106 feet deep. There are a No. 2 Rocker mill and two concentrators, run by steam power during the dryest season, about four months, and by water power for the balance of the year, working ten men in mine and mill. This is almost a new district and the above are recent discoveries.

The Shasta Dredging Co., J. M. Gleaves, president; Colonel R. W. Button, superintendent has recently placed a 40 H. P. machine in the Sacramento river just above Redding, operated by an engine and boiler, having an 8-inch sand pump; a steam pump operates a hydraulic jet reduced from a 4-inch stream to a ¾ jet. The jet cuts up the bottom of the stream, and the pump brings up everything including rocks 6 inches in diameter.

The John C. Hughes Mining Co., Geo. W. Grayson, Jr., superintendent, four miles northwest of French Gulch, has the American mine—a consolidation of six claims, and the Gold Bar, a combination of five claims, with a 10-stamp quartz mill run by water power ten months in the year, and by steam the other two. The American mine series is pierced by four tunnels, from 80 feet to 500 feet. This ore body runs east and west and dips south; hanging wall porphyry; foot wall slate; ledge varies from 12 inches to 5 feet thick. The rock is classed as low grade, averaging $6. The rock is free milling, the gold is coarse and all caught in the batteries. The Gold Bar combination is one mile east of the American, and runs in the same direction, with wall similar to that of the American. The ore body runs from 2 feet to 3 feet thick, and pays from $10 to $25 per ton. This mine is being developed by two tunnels, one in 150 feet, the other 250 feet. The last mentioned tunnel is a crosscut, and is not yet into the ledge. The values above quoted were from a mill test of 20 tons. Their mill is located one and a quarter miles south of the American and two miles southeast of the Gold Bar mine. The ore is transported by wagons at a contract price of $1 per ton. They are working 18 men in mines and mill.

Washington Quartz and Placer Mining Co., John Syme superintendent, is situated two miles west of French Gulch, consists of 80 acres, patented under the law allowing both placer and quartz entered together. The quartz portion consists of two systems of ledges, one running north and south, and dipping east, and the other running east and west and pitching south. The walls of both ledges are alike—hanging walls, slate; foot walls, porphyry. The north and south ledge averages 4 feet, free milling and carries 1 per cent of sulphurets. The east and west ledge is 3½ feet thick, and the same as the N. & S. in character. The ore will average $10 per ton in free gold. They own a 10-stamp mill (previously made for 22 stamps) run by water power, one of the oldest in this county. These ledges have been pierced by three tunnels on the east and west ledge, No. 1, in 1,000 feet —300 feet on the ledge; No. 2, is in 250 feet, and considerable stoping has been done, and No. 3 is in 500 feet—250 feet of which runs through ore. On the north and south ledge two tunnels have been run, one 450 feet, the other 200 feet to the ledge. The character and pay of both ledges are similar. The mine is temporarily idle, awaiting the erection of a new mill. Over $750,000 has been taken from the above combination of mines since their discovery in 1853. The placer portion of this company's property was worked by hydraulic process, by former owners, some 20 years ago, and is reported to have paid well.

The Gold Dirt mine, owned by D. Lyons & Co., is on Maddox creek, six miles north of Stella, J. Bradbury superintendent. This company's ore body runs north and south and dips east. The vein averages 4½ feet between walls of porphyry. The development consists of two shafts down 30 and 40 feet respectively. From 100 pounds of rock crushed in a mortar from this mine $54 was obtained, and from a mill test of nineteen tons it paid $18 per ton. A full force of men will be actively engaged by this company before this is in print.

The New Brunswick mine, owned and managed by F. B. Rossi, is on the Trinity divide, six miles west of French Gulch, and consists of three original locations. The ore body runs at an acute angle entirely through the mountain, northeast and southwest, and dips to the northwest. The ledge matter consists of a conglomerate of quartz, slate and porphyry, and runs from 75 to 100 feet thick between the walls. It is being developed by shafts and tunnels, and from both sides of the mountain. On the north side of the mountain one tunnel is in 400 feet, and a shaft has been sunk 40 feet. From this tunnel two upraises have been made, one 160 feet, reaching the surface. Two tunnels have been run in on the south side of the mountain, one in 80 feet, thence along the foot wall by drift for 200 feet. The second one has been driven in 360 feet, and drifts run northeast 25 feet and southwest for 15 feet. A mill test of 290 tons ran from $18 to $4 per ton. A 4-stamp mill is being put up on the south side of the mountain. The rock in the upper tunnel is free from sulphurets, and that found in the lower tunnel on the same side of the mountain is 25 per cent sulphurets.

Van Ness, Baker & Co. opened up a prospect some time last spring at a point ten miles north of French Gulch, on the east side of the Trinity Center road. The ledge matter running east and west, without any definite method of working it, they followed up some traces of free gold from the surface, and in a few feet took out over $11,000 in gold. The "company" part of this firm was entrusted to take this find to French Gulch for shipment. He has not been heard from since, although reported to be in business in San Francisco — since which time some $10,000 more has been taken out. L. P. Mc.

Free Press: The Mountain Mines, limited, are able to resume the operation of their entire property. They have not resumed work at the mine at Iron mountain. The ore trains are running irregularly, but there is more activity since the railroad was completed. Trestles and bins are being built at the switch back on the Iron Mountain Railway. Men are there quarrying the stone to be used in the construction of the roasting furnaces, which are 6x12 feet. When the whole plant is completed the roasters will number 500, to treat the ore for reduction at the smelters. The ore, which contains so large a percentage of sulphur as to cause it when heated in the smelter to form into large chunks, which seriously interferes with its operation, will be placed in the roasters. The sulphur will be fired and it is expected at the end of three weeks will consume itself.

At the switch-back the ore will be handled entirely by gravity. At Keswick the framework for a water-jacket smelter is up, and the iron supports for the castings of the smelter.

On Tuesday morning a fire was put in the patent smelter. There is a quantity of ore on the dump, which has been treated in the roaster which was built in the smelter yards. Much ore, which has not been treated, lies on the dump ready for roasting.

Searchlight: A builder's contract was filed with the County Recorder July 22d, in which the Joshua Hendy Machine Works of San Francisco, agrees to construct and place upon the land of the National Consolidated Mining Company, in Rich Gulch Mining District, this county, particularly on the portion known as the Potosi mine, a 10-stamp mill for crushing and reducing ores, to be completed on or before October 6th, 1896, and for which they are to receive $8250.

J. W. Frank, Red Bluff, who had eight mining claims in Harrison gulch, sixty-five miles from Redding, bonded them to J. H. Roberts of Sacramento, former owner of the Great American mine in El Dorado county for $110,000. W. H. Fowler and J. W. Frank are interested with Roberts in the purchase. They intend erecting a 20-stamp mill, with steam power.

Sierra.

A rich strike is report at the Buttes mine, Sierra City. Preparations to build a mill at the mine are reported.

The Craycroft mine has closed down.

Siskiyou.

Journal: Coulson & Thrash have leased their mine on Humbug to Brown & Hawland.

The Hegler Bros. at Humbug are getting

out some excellent rock which they crushed in their mill.

The Distleborst & Barton Dredging Company have been running their machinery on Klamath river the past few days, in order to have everything running smoothly when they start to work. The machinery works well.

S. Gardner, of the Gardner mine at Oro Fino, reports that his cleanup this year was $12,000. The Eastlick Bros. and Wright & Fletcher have also made their cleanup, and the returns have been satisfactory.

Tuolumne.

Democrat: At the App, since the repairs to the mill, from sixty to seventy tons are crushed daily.

At the Star the mill has been shut down owing to the scarcity of water. The mine is in good shape, producing high-grade ore. Arrangements are being made for putting in a four-drill air compressor plant. Chlorination works will shortly be built and a survey for a storage dam on Rose creek is now being made. The dam is to have a capacity of 38,000,000 gallons.

Supt. Trittenbach of the Dutch mine will put in a double hoisting plant, two boilers, pumps, etc.

At the Soulsby the new hoisting plant lately put up will soon be in use, after which the work of opening the mine will be pushed. Supt. Sharwood, in addition to his duties at the Soulsby, is working the Baker mine on his own hook.

The Golden Gate management is putting in an electric plant to furnish power for the hoist and lights for the mill and underground workings. It will be run by water power and will soon start up.

The Jumper keeps up its development work in addition to supplying the twenty stamps with ore. The tunnel being run to tap the New Era shaft will soon reach its destination.

C. and J. Fitzgerald of Quartz Mountain and C. Durgan of Jamestown have received the final payments on the purchase price of the New Era mine from the Jumper Co., who purchased it. The sum for which it was bonded was $30,000.

Democrat: A strike in a pocket of the Cardinell mine, near Tuttletown, is reported. In one instance years ago on the 200-foot level of the Cardinell picks unearthed a pocket valued at over $100,000.

At the Santa Ysabel the new machinery is being put in position.

New hoisting machinery is to be put in the Alabama.

The Mazeppa managers are going to put up a hoisting plant.

It is reported that two new deep shafts will be started at Stent, one on the Erin Go Bragh, the other on a claim near the Golden Rule.

The Doyle quartz and placer claim at Horseshoe Bend, on the Tuolumne river, has been bonded to Stover and Shorey for $9000.

NEVADA.

ON THE COMSTOCK.

Hale & Norcross superintendent's report: Main shaft—We continue easing timbers and making other necessary repairs in main shaft between 900 and 975 levels.

900 level—Have continued the work of cutting out a place in north drift, 154 feet from station, preparatory to starting an upraise from this drift. Have also been working on the sill floor. The general appearance of the ore streak is about the same as last reported.

975 level, No. 3 upraise—Have been working north on the tenth floor. The ore streak is very small on this floor. Have made necessary repairs on this level the past week.

Extracted during the week nine cars of ore, assaying, per mine car samples, gold $69.55, silver 39 9-10 ounces per ton.

Forwarded by express to U. S. Mint, Carson, on July 20th, 107 pounds of crude bullion (assay value as yet unknown).

This is the final bullion shipment for account of ore shipped in June and July and reduced at the Dazet mill, viz, 245 tons and 1800 pounds.

Brunswick lode (operated under the management of the Hale & Norcross Co.)—Main north drift from station was advanced 40 feet; total length 137 feet. Face in porphyry and stringers of quartz. East crosscut from south drift (30 feet from south boundary) was extended 6 feet, making its total length 36 feet; face in hard rock. Have started a south drift from this crosscut at a point 15 feet in from the main south drift, and advanced same 6 feet, showing both streaks of ore first cut in crosscut coming together.

ESMERALDA COUNTY.

The Grant Mountain Mining Company has fourteen men stoping ore from the 50-foot level. They have about 20 inches of free milling ore in the bottom of the Roper shaft, which is down 35 feet. C. A. Hascall is superintendent.

LINCOLN COUNTY.

The sale of the Keystone Mining Company's property advertised to take place July 20th, and continued for a month, says the Pioche *Record*, has not yet occurred, though it is expected to come out all right. The trouble seems to be that the New York parties who agreed to put up the necessary funds for the Lincoln company (which was organized to handle the property) failed at the last moment to honor their paper, and the matter is being pushed by attorneys for the Lincoln company, who propose to hold the New York parties to their contract.

OREGON.

BAKER COUNTY.

At Union, Or., a deal was consummated this week, the placer grounds on the headwaters of Grande Ronde river in the southern part of Union county being sold to French capitalists for $200,000.

WASHINGTON.

Snohomish *Tribune*: The "45" Mining company has a pack train of twenty ponies packing ore from the Sarah mine near the upper Sultan. The ore is packed twenty miles. The cost must be $50 per ton. Niemeyer, Andrus and other Machias parties are interested.

BRITISH COLUMBIA.

SLOCAN DISTRICT.

The decision of Justice Walkem in the Monitor case (Wills vs. Petty) gives a good precedent for the non-validity of verbal promises, or alleged promises, to share interests in mining claims. The Monitor was discovered upon the side hill opposite Three Forks last summer by George Petty. An option carrying $30,000 for thirty days was given, $500 being paid down. This option was not taken up. With the $500 as a start Petty began to ship ore, and the late prospect became a nice paying little mine. As soon as this was accomplished more or less claims of being "in on it" were preferred; and these, it is satisfactory to observe, have been decided as of no avail. The case is, however, carried on appeal to the Supreme Court of British Columbia. The matter is one of great moment to prospectors. Their partnerships and grub stake agreements are of the loosest kind. A man easily gives interests in his future prospects, but after spending hard work and money in proving them worth holding he is inclined to let his friends who are "in on it," and who have not done a stroke of work, carry their case to court, especially if the arrangement is not on file.

According to the customs returns of Nelson, and data furnished by the C. K. S. Navigation Company, a little over a million and a half dollars' worth of ore has been so far shipped out of West Kootenay for 1896.

At Boundary creek the "Mother Lode," Deadwood Camp, has been bonded to Col. Weir for $14,000. A preliminary payment was made and the remainder is in two equal installments at the end of six and nine months. The gold-bearing ore is copper pyrites, with a gangue, and, in some parts of the deposit, of solid magnetite; in others, of lime, pyroxenite and silicious material.

The Rossland *Miner* claims positive information that there is an option on the Le Roi and that it has been examined by the same experts who have come from London to examine the War Eagle under the Corbin option. It is understood the price of the Le Roi under the option is $2,500,000, but on this point we have no definite information. The third and last expert to examine these properties is now here and will make his report in a few days. The option expires September 2.

The report that the smelter of the Kootenay Mining and Smelting Company at Pilot Bay had passed into the hands of the Consolidated Kansas City Smelting and Refining Company seems premature though its absorption by that enterprising company is not at all improbable.

At Trail the new blast furnace for the British Columbia S. & R. company is being put in place. It will be in full operation September 1st. The smelter will have a daily capacity of 500 tons. A contract for an $8,000 office building for the smelter and Columbia & Western railroad has been let. The steamers are landing on an average 100 passengers a day. Development work on Lookout mountain continues, an average assay on the Sovereign, at a depth of 42 feet, running $28.

ALASKA.

Juneau *News*, July 23: The latest news received recently from Berner's Bay is that there is no prospect of the Comet mine being worked for many months yet. Good progress is being made on the lower tunnel, but it can scarcely be completed before January 1st. This is the richest mine in the Territory of Alaska, and its cessation from being operated for so many months will take off not a little from the gold output of the country for this year.

IDAHO.

The tailings works of the Fortuna Mining Co. at Duniphan will be ready to be started up next week. The works will use the cyanide process, with modifications which H. K. Thurber, managing owner of the property, has made as tests seemed to require. In these works there will be four oblong and twenty-two circular tanks. The oblong tanks will be 30 feet long, 3 feet wide and 2 feet deep; the circular tanks 36 feet in circumference, 11 feet 6 inches in diameter and 50 inches deep. If the process to be availed of is as effective as expected, the output of the Fortuna will be doubled—at least, while the tailings are reduced, anyway. There are said to be fully $150,000 worth of tailings at the old dump, and the mill is making more every day.

Lewiston *Teller*: The big mining boat, which was designed to gather gold from the bars of Snake and Clearwater, has been operated for a week. The bar was not rich and the gold is of the finest, lightest character. The gold is light and flaky. The machinery worked with perfect effect, and the sluices saved the gold. The company has a system of gold saving appliances, consisting of sluices, metal ripples, quicksilver catch basins and overlaps. After a run of four or five days there is hardly a color left in the sand. The clean-up gave a result of 27 cents to the cubic yard. The plant will be removed to another bar that is known to be very much richer.

The Little Giant mine at Warrens has been bonded by eastern men for $100,000.

MONTANA.

The Hope mine at Basin has been sold under attachment for $70,000, the amount of an overdraft on Helena. The company will be reorganized and development continued.

The De Lamar, Idaho, reports for June: Mill worked 20 days; crushed 3100 tons. Bullion produced in the mill, $38,365; estimated value of ore shipped to smelters, $4,775; miscellaneous revenue, $415; total produce, $43,555; total expenses, May and June, $37,389; profits for two months, May and June, $6,1668. Strike of miners and laborers caused a stoppage of work all of May. The men resumed work on June 4 at an advance of 50 cents per day. Milling at half capacity was started on June 8.

The Iron Mask at Basin has a vein of shipping ore. A 100-ton concentrator will be built.

The Ontario mine is shipping 30 tons of concentrates per day, valued at $1000. The railroad from the mine to Elliston will not be built this year.

Butte *Inter-Mountain*, Aug. 1: A big mining deal was consummated in Butte to-day when James A. Murray received from D. G. Bricker a check for $360,000, in full payment of the bond on the Moonlight lode and the east 500 feet of the Blue Jay claim near East Granite street.

The two claims were bonded to Mr. Bricker nearly a year ago, the Moonlight on a $60,000 bond and the east 500 feet of the Blue Jay for $300,000. Extensive development work has been in progress since that time. Two shafts have been sunk and a vein 60 feet in width has been opened up, eight feet of which will assay 40 per cent in copper. People who know say that the two properties are among the richest in the district, and that an offer of $710,000 was made for them by a big corporation some months ago.

It is understood that the properties were purchased by Mr. Bricker for Marcus Daly, and that Mr. Bricker will clear something like $100,000 on the transaction. The magnitude of the deal tends to show the value of the big mineral deposits of Butte.

A rich strike of copper glance was made during the week at the Glengarry mine in the Ground Squirrel district. This property is owned by the Montana Ore Purchasing Co. It is developed to a depth of 800 feet and the strike was made on the west drift of that level. The vein is a large one with two feet of copper glance carrying about eight ounces in silver.

WYOMING.

Lincoln, Neb., men, who have been inspecting the gold-bearing property of the Burlington Mining Company at Buffalo, have, in consideration of an interest in the mine, contracted to put up a sixty-ton stamp mill on the property within ninety days. The cyanide process will be used. The contract requires the investors to mine 1800 tons of ore for the first mill run.

COLORADO.

The large cyanide reduction works in course of erection at the new town of Cyanide, two miles north of Florence, will be ready to treat ore September 15th. The building, which covers the power house, sampler and crushing mill, is 100 feet wide by 200 feet in length and 70 feet high. West of this mill is another building of steel and iron, 65x95 feet, and contains a half dozen roasting furnaces to be used in roasting ores which do not otherwise yield readily to the cyanide process. The third and last department of the new works is the leaching building, covering a ground space of 59x195 feet. In this building will be placed three 650-ton steel tanks and four smaller ones of sixty tons capacity each.

The metallic extraction works of Florence, when completed, will be the largest of the kind in the United States.

Under date of July 31 F. H. Pettingell writes from Colorado Springs regarding mining stocks: Some stocks are high at any price, and I would caution all against buying cheap stocks indiscriminately, as the purchaser may awaken only to ascertain that the territory supposed to belong to the company has passed into the hands of others by default; this all too frequently occurs where patent proceedings are not properly cared for. It is always well to carefully scan the personnel of the management; ignorance is far more common than dishonesty in mismanaged corporations. I believe that after the Presidential contest is definitely decided, we will experience the broadest mining stock boom the country has ever beheld, not based on a hollow desire to speculate, but on business principles.

At Leadville Judge Owers has appointed W. H. Griffith receiver of the Weldon mine, which was seized by Peter W. Breene, owner of one-twelfth interest, after the miners struck for an advance in wages from $2.50 to $3 a day. Breene had reopened the mine, paying the wages demanded. The receiver was appointed on the application of the Weldon Mining Co. Judge Owers directed the receiver to work the mine and pay $3 to miners and $2.50 to laborers above ground. The union's demand is for $3 for all employed. This may result in a settlement of the long-continued Leadville strike.

Georgetown *Courier*: A one-tenth interest in the Badger lode at Empire has been sold for $35,000. The proceeds of the sale will be used in the purchase of a mill and in development.

NEW MEXICO.

At Pinos Altos the Golden Giant is working 45 men in the mine and mill.

The Treasure Mining Company has laid off a number of miners until connections are made between the 150 and 300-foot levels.

At Mogollon the Maud S. mine employs fifteen miners. The Colonial Company is working twenty men on the Last Attempt mine, which is furnishing free milling ore for ten stamps of the Maud S. mill, while the Maud S. mine furnishes sufficient concentrating ore for the other five stamps to handle.

The Little Fanny mine, conceded to be the richest mine in camp, still remains closed down. There was an abundance of ore developed and in sight when the mine closed down. Why the mine is not worked by the owners is a mystery.

The Confidence mine still continues the regular output of 80 tons per day, which is crushed at the company mill on Whitewater. L. Woods is superintendent.

ARIZONA.

(Special Correspondence).—Supt. S. A. Parnell of the Old Dominion copper mine has the property in good shape for the production of ore. All the stopes on the various levels are looking well. The new sinking pump is in place in the shaft and sinking was resumed on the 18th ult. The shaft (three-compartment) is now down 450 feet. At the hoisting works are three horizontal tubular boilers 5x16 feet and a new boiler house. Supt. Parnell is expecting the arrival of another new furnace that will have a daily capacity of 100 to 125 tons, when the present force of 150 men will be increased and more bullion turned out.

E. H. Cook, superintendent of the United Globe mines, has returned from Geronimo, the present terminus of the Gila Valley Globe and Northern R. R., where he had been to hasten the forwarding of a new 100-ton furnace and other machinery that he is waiting for. The smelter has closed down to make improvements that, when completed, will more than double the present smelting capacity. The smelter men have other employment during the shut-down.

The Black Copper group of copper claims, under bond to J. A. Fleming and Dr. J. M. Ford, six miles southeast from Globe, are under the management of W. W. Hill. The group comprises fifteen claims, the most noted of which are the Black Copper, Copper Dyke, Green Carbonaté and Montgomery. These properties have large quantities of silicious ore in sight. Supt. Hill has two shifts sinking on the Black Copper, and is now down 100 feet and has been in ore all the way. At 100 feet he is crosscutting and is in 15 feet and is still in ore going from 10 to 20 per cent. They are also sinking on the Montgomery and have equally as good a showing. These leads can readily be traced a distance of six full claims. Mr. Hill is as yet undecided whether he will erect a smelter or a leaching plant. It all depends what his base ore will be. If it carries an excess of iron, he will erect a modern smelter on the property. If there is not enough iron in his base when he reaches it, he will put up a leaching plant, manufacture his sulphuric acid on the ground and use electrical precipitation. It is confidently expected here that when this company gets in full swing there will be a town in that vicinity that will compare favorably with that of Globe.

Globe, Arizona, Aug. 1st, '96.

Gazette: Another shipment of silver ore from the Eclipse mine will be made next Monday and the big freight teams have orders to return immediately as still another carload of rich ore worth about $4,000 a car is ready for shipment. The Eclipse is the only silver mine in Arizona that works extensively.

Messrs. Tomlinson and Brandon of Prescott were recently in San Francisco. They represent the Brown Dake Gold Company of Arizona, capital $1,500,000, recently organized, which last May bought nine claims at Prescott, which have a record of producing $300,000. There is a 20-stamp mill on the property, an assay outfit and concentrating machinery. As to mining in Arizona, Mr. Tomlinson says that prospects are good and the mines are doing well. The Congress mine, a gold property sixty miles south of Prescott, is running a profit of $40,000 per month. It is putting in forty more stamps, doubling its capacity, and is building four miles of railroad to connect with the Santa Fe, Prescott and Phœnix. Petroleum will be used for fuel on the railroad and in the mine. Near the Congress is the Planet group, owned by a Boston syndicate. It was purchased for $40,000 cash and $50,000 was put up for a working fund.

The *Herald* hears that another attempt will be made by a French syndicate to work the placer beds of the Colorado river. It is thought they will put in a power plant that will melt the cement strata through the gravel.

At Mammoth, Pinal county, this week, a flood nearly swept the entire camp away.

Government sampling works are to be erected at Nogales at a cost of $10,000. The late Congressional appropriation set aside $35,000 for three Government works, one at El Paso and the other two on the northern boundary.

MEXICO.

The principal mine at Guanajuato is the Valenciana. It has thirty-two miles of underground workings. The main shaft is 2700 feet deep, of octagon shape, walled with stone, and 32 feet across. It is said to have produced $10,000,000, principally in silver, and to have employed from 3000 to 5000 men. It now employs about 1000 men in the upper levels. In the lower levels and shafts are 800 feet of water. It is said that at the bottom of the shaft there is 30 feet of rich ore. All this immense work was accomplished by hand, without a particle of machinery. It is estimated that it would cost $500,000 to erect a pumping plant to get this water out and keep it out. There are driveways for miles zigzagging down into the mine to a depth of 1000 feet. At one time there were in the neighborhood of 4000 arrastras at work in the town and 1600 tons of ore were crushed every 24 hours. At present they are crushing about 350 tons of ore a day.

A Hermosillo dispatch says: "The Rothschilds have just closed a deal for a group of

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the richest gold mines in this State. The reported purchase price of the properties is $5,000,000 in gold."

SOUTH AFRICA.

The Transvaal State Mining Engineer, Mr. Klimke, reports from that section that the total yield of gold for 1895 was 2,494,487 ozs., of the value of £8,569,555, as against 2,239,865 ozs., valued at £7,667,152 for 1894, and being an increase in ounces of 254,622, and in value £902,403, or an advance of 11 per cent. The increase is attributed chiefly to the extent of the development of the old Witwatersrand mines. The improved means of working gold is instanced in the fact that the yield per stamp per day of 24 hours has increased from 3627 ounces per ton to 4009 ounces per ton, or almost 10 per cent. In 1895, 3,903,333 tons of quartz were crushed compared with 3,269,462 tons in 1894, an increase of 633,871 tons, or 19.4 per cent. The yield of gold from the mills was 1,636,135 ounces, compared with 1,457,103 the previous year, an improvement of 172,932 ounces, or 12.3 per cent. Gold obtained from the mills comprised 68.8 per cent of the total yield, compared with 68.4 per cent in 1894.

From tailings the yield was 749,325 ounces, of the value of £2,282,903, equal to 26 per cent of the total yield. Some 3,015,986 tons of tailings were treated by the cyanide process and 193,256 tons by other processes. Concentrates gave 105,900 ounces, valued at £383,998, equal to 4.48 per cent of the total yield. The average yield of concentrates obtained from the Witwatersrand conglomerate was 3072 ounces per ton, and from the quartz in the mines near Barberton, 6394 ounces per ton. By the chlorination process 14,820 tons were treated, giving an assay value per ton of 4710 tons, and from this 90¼ per cent assay value was obtained. By the cyanide process 19,558 tons were treated, with an assay value per ton of 1535 ounces, of which 91.6 per cent was secured. Altogether there were 34,378 tons of ore treated by concentrates, which yielded 2904 ounces per ton.

The gold yield of the placer mines shows a decrease of 3666 ounces, valued at £12,806—that is, 0.2 per cent of the total yield in 1894, compared with 3127 ounces, valued at £10,982, or 0.12 per cent of the total yield this year. In 1885 the yield in ounces was 1737; ten years later it had reached a total of 2,494,487. The grand total for the twelve years, from 1884 to 1895, inclusive, was 9,749,170 ounces, representing a value of about 33½ millions sterling.

During 1895 there were working above and below ground, in connection with the gold mining industry, 7523 whites and 54,127 colored people, mostly Kaffirs; underground there was an average of 6116 whites and 47,240 colored people. By these workers, in the course of the year, 133,417 meters of driving were done, and 48,228 meters of shafts sunk. The total quantity of quartz excavated amounted to 4,377,142 tons. During 1895, 26 whites and 139 colored people were employed on the alluvial fields.

Dealing with Witwatersrand, Mr. Klimke states that these fields produced 89.77 per cent of the total yield of the country, namely, 2,223,066 ounces, valued at £7,693,371. During 1894 they produced almost 88 per cent of the total yield, so that last year there was a slight increase in the proportion. At the end of 1895 there were in force on these fields 92,305 prospecting and 3283 digging licenses.

In the introductory portion of his report, the State Mining Engineer says that, so far as can be ascertained from the returns of the mining companies, which at the end of last year numbered 170 (not calculating the mines worked by syndicates and private persons), there was a nominal capital invested in the industry of £43,544,983, an issued capital of £40,787,029, and a working capital, including cash payments to vendors, of £12,037,225. The working capital, therefore, amounted to about 29½ per cent of the issued capital. The increase of capital during 1895 amounted in round numbers to £18,000,000 sterling, or about 78 per cent of the aggregate issued capital of the previous year.

The total amount of dividends paid out by mining companies to the end of 1894 was £5,159,930. Of this, £100,830 consisted of dividends paid by coal mines, leaving a balance of £5,050,100, or about 24 per cent of the total value of the gold yield to the present time as dividends paid by gold mines. The figures for 1895 are for gold and coal mines, together, £2,595,210; for gold mines alone, £2,550,712, or about 30 per cent of the year's output of gold. At the end of the year there were 281,691 prospecting and digging claims.

The following is a summary of the total operations in the Witwatersrand district for the three months ending Sept. 30, '95, and for the first three months of '96:

	Quarter End'g Sept. 30, '95.	Quarter End'g March 31, '96.
Meters driven	31,273	23,373
Meters sunk	10,447	8,208
Tons ore extracted	1,044,586	909,172
Tons milled	912,061	819,350
Tons milled, dry process	....	3,343
Tons per stamp per day	4.142	4.245
Concentrates prod'd, tons	9.578	8.658
Concentrates treated	8.772	7.107
Assay value, ozs	2 898	2.943
Tailings treated, tons	764,410	593,677
Assay value, ozs	0.237	0.249
Whites employed	6,764	7,221
Colored employed	46,506	42,392
Mill yield, ozs	393,793	318,757
Mill yield per ton, ozs	0.432	0.389
Value	£1,421,110	£1,146,038
Value per ton	21s 2d	28s 0d
Concentrates yield, ozs	27,030	21,719
Concentrates assay, ¥ ton	3 061	3.056
Concentrates value, ¥ ton	221s 10d	222s 7d
Tailings, ozs	163,519	134,371
Tailings per ton, ozs	0.214	0.226
Tailings, value	£519,581	£424,051
Tailings, value per ton	13s 7d	14s 3d
Total production of the Witwatersrand, ozs	584,342	476,921
Value	£2,037,530	£1,655,659

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Free transportation for exhibits and reduced rates of fare will be given on all railroads. Address the Secretary for information of any character Premium lists now ready.

EDWIN F. SMITH, Secretary. C. M. CHASE, President.

Commercial Paragraphs.

THE Edward P. Allis Company have a $45,000 contract to furnish all the machinery for the chlorination works at Colorado City, Col.

THE new Huntington Roller Quartz mill was given a test at the works of the Fulton Engineering and Shipbuilding Co. this week, with satisfactory results. The mill will be on exhibition at the Mechanics' Fair next month.

TWO "Woodbury" Concentrators shipped to Australia by the last steamer, added to eight shipped on the steamer before is a good showing for one month, and speaks well for the reputation of California machinery among practical mining men of the Antipodes.

ADAM SCHILLING & SONS shipped on the 1st inst. one 12 H. P. Golden Gate gas engine hoisting plant for use in the Rose mine, near Victor, San Bernardino county. This hoist will be placed 300 feet under ground, and is to hoist 1000 pounds 500 feet at the rate of 110 feet a minute.

A TRUAX SILVER STATE ORE CAR was received by Iunker Bros. last Sunday, for Humphreys & Quigley, to be used at the Commodore mine on Barkhouse creek. The car is one of the latest patents, and the ore can be dumped wherever they please with it. It is made entirely of iron and is the strongest and most convenient car made.—Yreka Journal.

MANAGER GRAHAM of the Vulcan Iron Works, which recently suffered a temporary derangement by fire, has secured premises at the corner of Francisco and Kearny streets, this city, where the Vulcan Iron Works are now in running order and prepared to do a general foundry and machine business. The office is corner First and Mission streets.

THE Penberthy Injector Company of Detroit, Mich., celebrated on July 25th the manufacture and sale of 100,000 Penberthy injectors. The first Penberthy injector was made by this firm on June 5, 1886, and was numbered "No. 1." No. 100,000 was made on May 12, 1896, so that in a little less than ten years 100,000 of these devices have been turned out and sold.

THE Pelton Water Wheel Company has a contract for the hydraulic work of the new power station of the Central California Electric Company, Newcastle, Cal. There will be two pairs of 48-inch Pelton wheels mounted on a cast-iron base, direct connected with Westinghouse generators, the wheels having a capacity of 1200 H. P. running under 420 ft. head at 400 revolutions. The power transmitted will be 28 miles to Sacramento.

THE Jeffrey Manufacturing Company of Columbus, Ohio, have taken up the manufacture of the Robinson patented coal washing machinery. There are many in daily use in this and foreign countries, and it is conceded to be a most efficient and simple washer. Points of special advantage are its simplicity, compactness, low cost of installation, low cost of operation, economy in the use of water and its washing of coal that is not closely sized. For catalogues address the above company.

IN contrast with the dullness reported in that vicinity, is the unusual activity displayed at the works of the Link Belt Machinery Co., Chicago, who have been operating their machine shop with two gangs of men both day and night during the past three months. The foundry, as well, is being worked to its limit, one order for castings alone requiring 987,000 pounds of iron. A notable order is that for furnishing the Chicago Sugar Refinery with a complete equipment of machinery for handling coal from cars to iron bins located over 25 B. & W. boilers in power house—from bins whose storage capacity is 650 tons. The coal is spouted directly on to chain grates in boilers. An order for the Huron Iron Co., Mich., for two 8-foot spirally grooved hoisting drums, together with 11½-inch by 25-foot shaft, friction clutches, base plates, etc., and brake bands, for running the drums independent of each other, etc., both for hoisting and lowering, is nearing completion. The two friction clutches and brake bands are so arranged that they can be operated by one man, without moving from one place to another, the operating mechanism being brought to center of frame.

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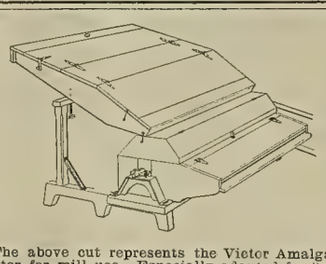

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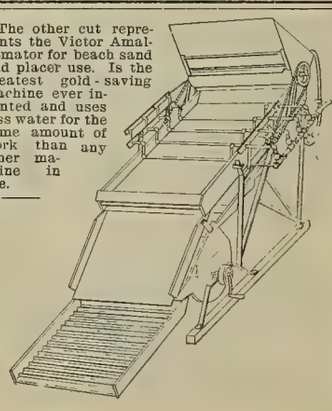

Coast Industrial Notes.

—At a depth of 2000 feet a big flow of natural gas has been struck at Stockton, Cal.

—The Astoria Iron Works, Astoria, Oregon, recently turned out the biggest casting ever made in Clatsop Co.

—An order for 5,000,000 feet of fir lumber for an European dry dock has been secured by the Port Blakeley, Wash., mill through the Pine Lumber Company of San Francisco.

—The new Northern Pacific tariff on canned salmon went into effect yesterday. The rates from North Pacific coast terminals are 65 cents to New York, Philadelphia and Baltimore and 67 cents to Boston.

—The Northern Pacific Steamship Company has announced a new rate of $6 a ton on flour from Tacoma to Hongkong, Yokohama and the Orient. This is $6 in Mexican money, and amounts to $3 24 in gold. The prior rate was $2 Mexican, which has been in effect during the last nine months. The rate was $4 the preceding year, and $6 before then.

The following is a translation from *El Comercio*, of Lima, May 16, 1896, and is commended to the attention of our San Francisco merchants: During the week ending to-day, the first vessel of the West Coast Line, inaugurating steam traffic between New York and the principal ports of Chile and Peru, left Callao on her return voyage to New York. Until the present time, this company has carried on trade with sailing vessels, but it proposes henceforth to send out a cargo steamer regularly every two months from New York to Callao. It has been two years since the New York and Pacific Steamship Company, better known as the Merchants' Line, opened a regular steamship trade between New York and the principal ports on the Pacific coast of South America, and now comes a competing campany to divide the proceeds of this trade and to afford to these countries a new line of communication with the United States. We could cite but few examples that would more conclusively demonstrate the powerful influence which steam exercises in promoting trade than that given by the latter company in opening a route practically creating a new direct communication with the eastern part of the United States. In starting, it had but three vessels, but later, it sent out a vessel every forty days. Now, it has five and the departures are every twenty-five days. This is not all that is notable in estimating the accruing benefits. Prior to the existence of this line of steamers, our trade with the United States had to go by the Panama route, where it was subjected to the overcharges and burdens occasioned by this reshipment through the Isthmus. The freight from all our ports, per ton of 2,000 pounds, was $25 for ores and coffee, $48 for coca, $35 for common wool, $40 for alpaca, and $22 and $25, respectively, for the goatskins and cotton shipped from Paita. It will be readily seen that with freights ranging from £5 to £6 per English ton, it was impossible for our trade with the United States to acquire any importance. Consequently, the shipments were confined to some cotton from Piura, some skins and hides, and a few bales of coca leaves and sacks of coffee. This forced the mercantile interests in the United States to go to Liverpool for the products of Peru, such as the fine wools required to mix with others in the manufacture of certain textures, the thought of importing directly from Peru being unrealizable. Now that freights on wools have been reduced to £3 5s., with a likelihood that the competition will bring still greater reductions, direct shipments to the United States have become important, particularly since ordinary wools realize one penny more there than on the Liverpool market. It will be observed that the simple reduction of freights, caused by the establishment of a regular line of steamers, has opened a new and better market for the principal products of this country. For the same reason, our national mining industry has been equally benefited. The crude ores that used to pay £5 1s 2d now pay but £1 1s 2d, and the quantities going directly to the North American smelting works are considerable. The cottons from Ica, that were exported exclusively to England and France, go likewise to New York. The shipment of coffee and coca to the United States, with freights reduced to £3 1s 4d and £3 1s 2d, are growing in importance. The same may be said of the cotton and goatskins from Paita, which now pay £2 less per ton. Shipments of cacao, cascarilla, and balsams have also commenced, and with a regularity equal to the departure of steamers from the port of Mollendo, lots of caoutchouc from the mountains of Sandia, Cuzco, and the Madre de Dios are going the same way. But a few months have sufficed to produce this important evolution in our commercial system and to divert a goodly part of Peruvian products from the old route to Europe to the new one to the United States—a nation with which, for various reasons, it is advisable for us to extend our commercial and friendly relations. It is rational to presume that similar changes will be experienced in the export trade from New York to Peru, owing to the existence of the two navigation companies referred to, and that the original mode of sending merchandise from New York to Peru by way of Liverpool will be abandoned—which, though it crossed the Atlantic twice, paid less freight than by former direct shipments from the United States to Peru. With reference to the last official commission created by the United States to investigate and report upon the best means to promote commercial intercourse between that Republic and those of South America, we expressed the opinion that the objects in view could only be attained by the establishment of a steamship line that would offer cheaper freights for the exportation of Peruvian products to the great markets of the United States. Governed as they are by cable, the actual needs of commerce require regular steam service, as they can no longer be met by sailing vessels. Lower rates of interest, lower insurance, the arrival and departure of merchandise at precise dates, are advantages indispensable to commerce which steam alone gives and which go practically to reduce freights. In view of the favorable results which have already flowed from the establishment of the Merchants' Line, it would be advisable to think about establishing other lines between the United States and Peru. The most useful, perhaps, would be a line between San Francisco, Valparaiso, and intermediate ports of the west coast of South America and another from New York or New Orleans to the Amazonian region of Peru. Mr. Jastremski, the American consul at Callao, has called the attention of his Government to the first route, for the benefit particularly of the wheat growers of the Pacific States of the great northern Republic. Indeed, the importation of wheat and flour to this country fluctuates annually from 35,000 to 40,000 tons, and well might this volume of breadstuffs give material assistance to the traffic between the States referred to and our own country. With reference to the second route, we may assert that the commerce of the Amazonian region of Peru is increasing daily. Nearly all the carrying trade there is in the hands of the powerful English navigation company, which, with its sixty steamers of various dimensions, maintains, without reshipments, a traffic between Liverpool and Manaos. The readers of *El Comercio* have been informed in this connection that Mr. Charles Mouraille has recently inaugurated, with the steamer *Huascar*, a new line between Havre and Iquitos. Our Government can not fail to perceive the influence that the development of the resources of its Amazonian regions will exercise in the economic progress of the country, and we assume that the Government will endeavor to induce that of the United States to lend its powerful aid in the formation of a steamship company that will establish regular communication between the eastern ports of the great republic and the ports of the deep, virgin tributaries of the Amazon. It can not be doubted that the profits of such an enterprise would go on increasing proportionately with the increasing extraction of the immense quantities of rich products which are lost for the mere want of transportation to the markets where they command the good prices awaiting them.

Personal.

NAYLOR WILLIAMS has resigned as superintendent of the Madison mine, Calaveras Co., and will occupy a similar position at the Jones mine, Carson Creek, Cal.

THE *Mining Investor* says T. W. Goad has resigned the active management of the Gold and Silver Extraction Company of America, his resignation to take effect on Sept. 1st. Mr. Goad has been in Colorado for seventeen years, was prominently connected with early mining operations at Leadville and other parts of the State,

Obituary.

SIR WILLIAM GROVE, the famous scientist and electrician, died in London last Saturday, aged 85. Sixty years ago he turned his attention to the study of electricity, and in 1839 first constructed the voltaic battery which bears his name. He was one of the first, if not the first, to fully develop and clearly demonstrate the now generally accepted scientific doctrine of the correlation of forces.

Recently Declared Mining Dividends.

Quincy Copper Mining Company, Mich., $6 per share, $300,000, Aug. 17th.

Alaska-Mexican mine, quarterly dividend $18,000, Aug. 1st.

Alaska-Treadwell mine, a quarterly dividend of 37½c. per share, $75,000, Aug. 1st.

Osceola Copper Mining Company, Mich., $1 per share, $50,000, July 25th.

Homestake Mining Company, 25c per share, July 25th.

Ontario Mining Company, Utah, $15,000, Aug. 7th.

Recent California Mining Incorporations.

The Dixon Mining Company, Los Angeles, Cal.; F. H. True, M. Santee, F. E. King, F. W. De Van, E. T. Wright, J. Goldsworthy, H. Scofield; capital stock, $500,000, all subscribed.

Mayday G. and S. M. Co., S. F.; C. F. de Lay, S. Creba, A. D. McLean, J. J. Welsh, J. Howes; capital stock, $50,000, $1200 subscribed.

M. H. WALSH. Secretary and Manager. C. G. BACON, President.

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Sonora, Tuolumne Co., Cal.

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Please permit us to express our entire satisfaction with the 10-horse power Hercules Gasoline Engine and Hoist purchased from you last August. We have worked it for the last three months and find it to do excellent work; likewise the 4-horse power Gasoline Engine purchased some time ago, which is now being used for the lighter work. Yours very truly, TEXAS CON. GOLD MINING CO.

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The Amalie Mining Company bought a 3-horse power "Baby Hoist" as an experiment, and within six weeks ordered another 6-horse outfit.

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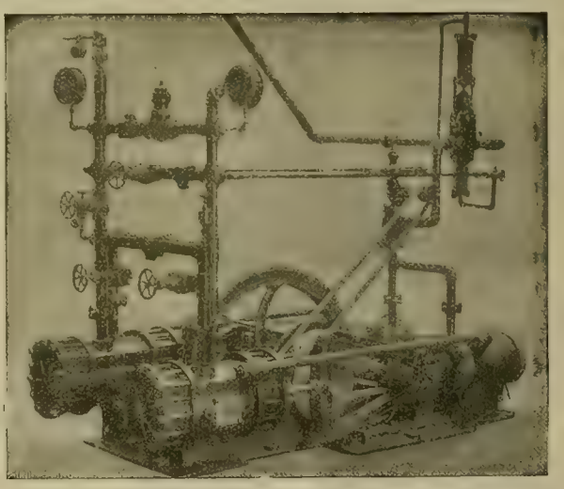

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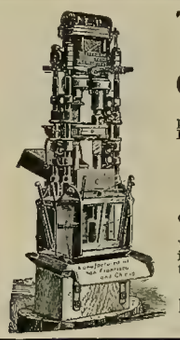

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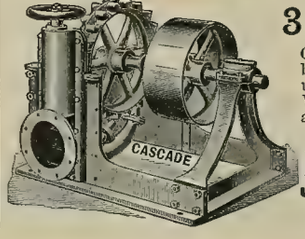

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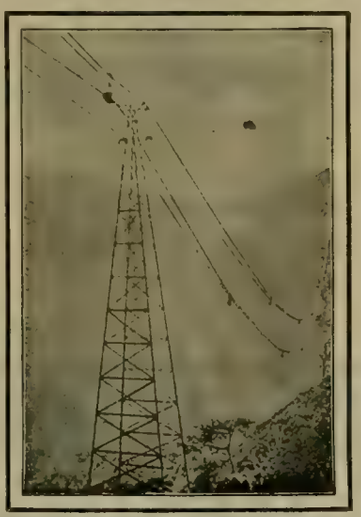

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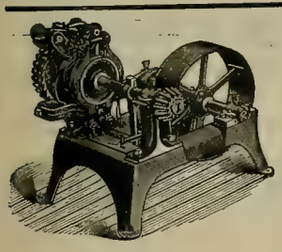

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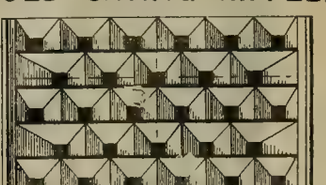

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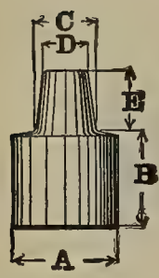

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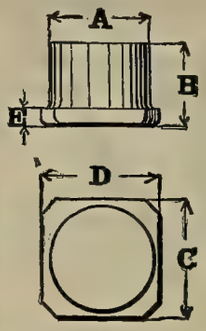

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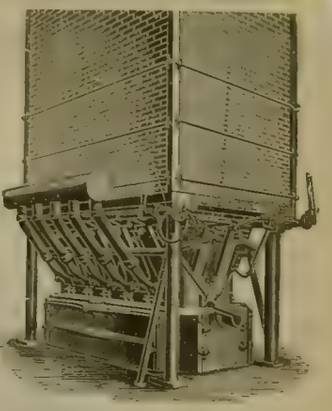

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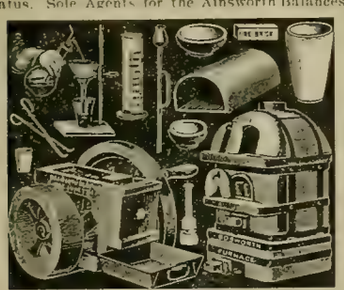

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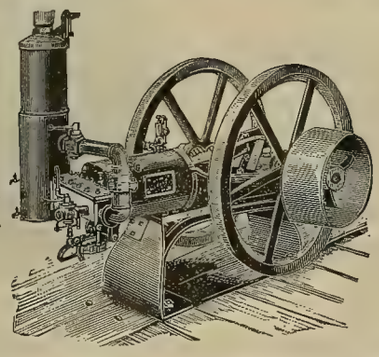

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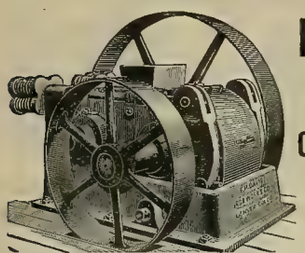

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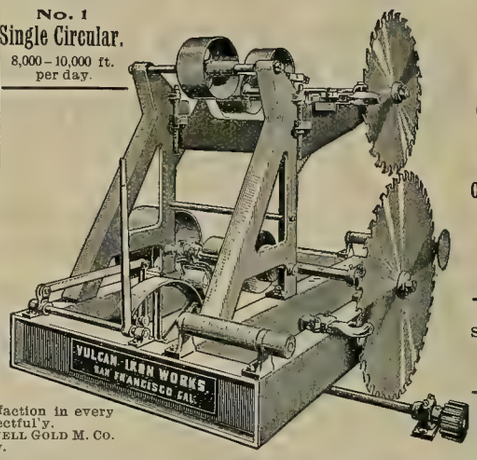

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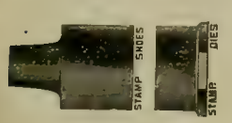

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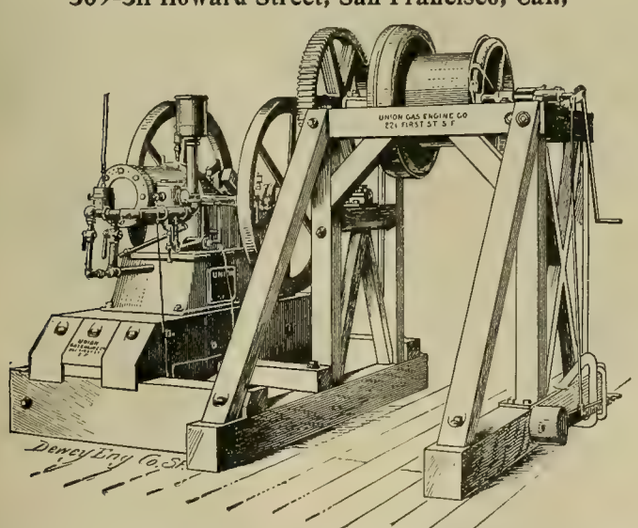

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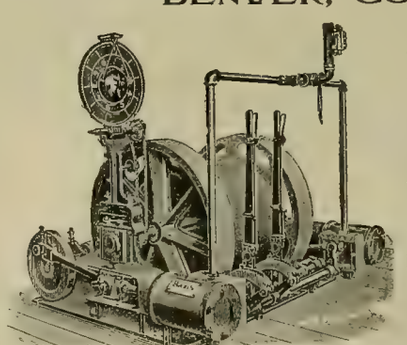

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24-26 MARKET ST., - - - - CHICAGO.

Market Reports.

The Markets.

SAN FRANCISCO, Aug. 6, 1896.

Business continues good in all branches of trade. The relative low prices ruling for goods and small margin of profits under close competition are against jobbers. There is a continued growing interest in gold mining. It is the accepted opinion that this fall more money will find investment in gold mines than was put into it at the corresponding time in 1895. The silver agitation with gold still commanding premium in Austria-Hungary and two or three other European countries, will naturally create a desire for investment in gold mines on a paying basis. While there are a good many properties offering in this city for sale, there are very few that are sufficiently developed to invite buyers outside of those willing to take chances on the prospects.

In the local money market there is nothing new to report. The banks state that the usual accommodations are extended to regular patrons, while others having first class security can secure loans. All dealings are on a gold basis which is no different from that which has been in vogue on this coast for thirty years. Merchants report that collections are made with more ease than for several years past. This is due to the retail trade not stocking up much, only buying in a hand-to-mouth way and also the general activity in gold mining districts and lumbering camps on this coast. At the East money is reported fairly firm and borrowers having first class securites to offer being quickly accommodated. The suspension of a large speculating firm at Chicago, identified with two leading industries has had an unfavorable effect there, but which, it is stated, will be only temporary in character. Securities, cereals and provisions at the East are feeling the effects of lower prices ruling to-day.

New York Silver Prices.

NEW YORK, Aug. 6.—Following are the closing prices for the week:

	—Silver in— London.	N. Y.
Friday	31⅞	68⅝
Saturday	31⅞	68⅝
Monday	31⅞	68⅝
Tuesday	31⅞	68⅝
Wednesday	31⅞	68⅝
Thursday	31⅞	68⅛

	Copper.	Lead.	Iron.	Tin.
Friday	10 75	2 85	10 25@12 50	13 40
Saturday	10 75	2 85	10 25@12 50	13 40
Monday	11 25	2 90	10 25@12 50	13 40
Tuesday	11 05	2 85	10 25@12 50	13 40
Wednesday	11 00	2 85	10 25@12 50	13 40

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	.5
New York Telegraphic Transfer	.7½
London Bankers' 60 days	$4.88
London Merchants	$4.86¼
London Sight Bankers	$4.89¾
Refined Silver, per oz., 1000 fine	68½
Mexican Dollars	53¾@54½c

All exchanges are nominal.

SILVER.—The market has held dull but steady up to this morning when it shaded off slightly in sympathy with lower prices at the East. Notwithstanding Eastern exporters claimed that European markets did not justify shipping, still the quantity that has gone out from New York to Europe has footed up quite large each week. There are no indication free shipments setting in soon for the Orient; evidently foreigners do not take much stock in the free coinage agitation in this country, or else there would be buying for speculation.

MEXICAN DOLLARS.—The market is quiet and easy. There is only light inquiry for export.

COPPER.—The market has been fairly steady in this city, but at the East it fluctuated slightly. The consumption in this country is still not up to expectation, but in Europe it is continued on a liberal scale. Stocks there are comparatively light., and are said to be steadily drawn notwithstanding the heavy imports. With this the case it would seem as if prices ought to appreciate unless copper producers fear a falling off in the demand with no corresponding decrease in production.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—There is a higher domestic call, but for export to Mexico there is a continued free movement. The last steamer leaving for Mexican ports took out 342 flasks.

The market is quoted as follows:

Home trade, per flask	37 00
Distant points up north	36 25@37 00
West coast of Mexico, for export	34 50

ANTIMONY.—The demand is fair with the market steady at 7¾@8¼c in a jobbing way. New York mail advices quote 7⅜@7½c for Cookson's, 6½c for Hallett's and 6½c for Japanese, from store.

LEAD.—The demand is still slow from corrodres owing to a liberal supply of foreign. For shot making purposes the demand will set in soon.

Pig	3 75	@	4 00
Bar	—	@	4 15
Sheet	—	@	5 50
Pipe	—	@	4 75

SHOT.—The market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—For both pig and plate there is a light inquiry.

Pig, per lb	14½c
Plate, I C coke, heavy, per box	$4 25
" " " light, "	4 10

BORAX.—The market is quoted as follows

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	6⅛
Concentrated, "	5⅝

POWDER.—The call for mining purposes very heavy, fully 20 to 30 per cent more than at this time last year.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

IRON. — Our market is practically unchanged. Eastern advices state that for this season of the year there is a fair inquiry, with several large orders placed for rails. It is expected that by November renewed activity will set in.

COAL.—There is nothing new to report in our market for spot, to arrive or for shipment.

SPOT FROM YARD—PER TON.

Wellington	$7 50	@	8 00
Greta	6 00	@	6 50
Nanaimo	6 50	@	7 00
Gilman	5 50	@	6 00
Seattle	5 00	@	5 50
Coos Bay	—	@	4 50
Cannel	—	@	8 50
Egg, hard	—	@	11 50
Wallsend	—	@	7 00
Scotch Splint	—	@	7 50
Brymbo	—	@	7 50

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	—
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	—		—
English, to load	8 00	@	—
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	—
Cumberland	—	@	—

LUMBER.—Advices from Puget Sound continue to report a good export movement, although not up to what ruled last year at this time. The home demand is quiet.

The market is quoted in this city from dock or yards as follows:

Redwood, Fluming	17 00	@	—
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The consumption continues fair, but the trade do not anticipate their wants, fearing lower prices.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, Aug. 6, 1896.

Chollar continued the leader the past week. It sold at $3.05 on regular call last Friday, on Monday at $2.25, the next day up to $2.65 and yesterday down to $2.45. The rest of the market moved in sympathy, with business confined largely to shares of the Comstock mines having ground on the Brunswick lode. Two weeks ago, when Chollar sold at $1.80, the Gold Hill shares were higher than yesterday, with Chollar selling around to $2 50, but the north end shares sold slightly higher than two weeks ago and the other middle shares about 10 per cent better. The depression in the Gold Hill shares is said to be due to the management being desirous of freezing holders out of certain desirable shares. This can be done the better by not giving them support and also by putting on assessments. But the Gold Hill mines are not the only ones to be assessed, for, if reports be correct, several are pending by the north end mining companies; but the management of these mines seem to give better support to the market value of the shares. There is no denying that the general trading public are not paying much attention to the market. With them there seems to be a feeling that prices must go lower before there is much in the market, and, having settled to this belief, they are rather indifferent as to the way in which it is being manipulated, notwithstanding there have been strong buyers. Experience has taught that the latter can buy and then send prices down before an upmove of a pronounced character, and it is this knowledge that makes the average trader shy, particularly with values being worked largely on a gambling basis, for at present the ore development on the Brunswick lode is not sufficiently large to justify higher prices than now rules for shares of the Comstock mines working on that lode. It is a game that no one should play at that can not afford to lose what money he puts in if the prospects do not come up to expectations. Shrewd operators say that, if there is no large ore development, it will be hard to sell the shares and prices must go down; but, on the other hand, if expectations should be realized, then the manipulators will not want to do much in the market towards higher prices until they have frozen outside holders out of their shares. By this reasoning, it seems to be largely a case of tossing up a coin, with heads insiders win and tails outsiders lose.

The following mining companies report having had balances on hand August 1st, 1896, as per sworn statements filed in their offices today: Andes $11,538.75, Alpha Con. $1547.37, Alta $5455.29, Best & Belcher $1050.72, Bullion $3626.21, Bodie Con. $4193.92, Bulwer Con. $7641.31, Caledonia $4462.65, Con. New York $1934.88, Crown Point $5689.85, Con. Cal. & Va. $26,599.47, Chollar $24,089.24, Confidence $8817.94, Church $9528.94, Challenge Con. $858.86, Con. Imperial $287.33, East Sierra Nevada 48 cents, Exchequer $981.99, Gould & Curry $2930.92, Julia Con. $296.94, Kentuck Con. $2470.31, Lady Washington $90.32, Mexican $11,282.53, Mono $2895.78, Ophir $4077.96, Overman $9748.45 Occidental Con. $3801.92, Potosi $9349.65, Seg. Belcher, $4345.46, Scorpion $1332.98, Syndicate $607.77, Standard Con. $13,262.47, Savage $11,526.79, Sierra Nevada $4380.25, Silver King $2764.21, Summit $41.50, Silver Hill $1332.45, Union Con. $4556.66, Utah Con. $1878.86. The following companies report having had an indebtedness August 1st, 1896: Belcher $352.10, Hale & Norcross $3142.99.

From the Comstock mines our advices continue to report exploiting work in Alta, but no work in the other Devil Gate mines. In the Gold Hill mines, so far as we are advised, work has not been resumed in Caledonia. In Overman they are raising a few tons of ore while prosecuting work. Seg. Belcher and Belcher continue to extract and raise some ore each week, but not enough to cut any figure. As to the work that is being done in these two mines the official letters remain discreetly silent. In Crown Point they continue to work on the 600-foot, 700-foot and 1100-foot levels. From the latter level 200 tons of ore has been extracted and when a sufficient quantity has been raised a test run will be made. Work has not been resumed, so far as we are advised, in Kentuck, but a 5-cent assessment is being collected. It is reported that two miners are at work in Yellow Jacket, but what they are doing outsiders are not advised. In Confidence air connection has been made which will admit of active exploiting work in that mine and Challenge. Work is continued in the joint Confidence, Challenge and Con. Imperial cross-drift and also in cross-drift No. 3 in the latter mine. In Alpha the work is still on the 500-foot level. They have been fully three years trying to find the ore reported about four or five years ago. It may take two or three more assessments before their efforts are crowned by success. No change is reported in the work in Bullion. In Potosi they are working on the 450-foot level, with no material change reported. They are at work in the same level in Chollar. The latter mine raises each week over 100 tons of fair grade ore. It assays over $20 a ton. No change is reported in the work of Gould & Curry and Best & Belcher. Con. Virginia's official letter reports work on the 1000-foot, 1650-foot and 1750-foot levels. While the general formation is favorable in the 1000-foot level, nothing of value has as yet been found. They raised last week 157 tons of ore from the 1750-foot level, which assayed around $50. How long this ore will hold out is hard to say. Work is continued on the central tunnel and 1000-foot levels in Ophir. No material change is reported. In Mexican work is still being pushed on the 1000-foot level. In Sierra Nevada, Union, Utah and Andes no change is reported. In Utah they have put in an air blower for ventilation to facilitate work.

From the Brunswick lode our advices are to the effect that Occidental is milling some ore. The work in this mine is on the same levels heretofore reported, with no essential change reported in the material encountered or formation of the ground. In Chollar it was expected that two crossdrifts would be started this week so as to strike the downward continuation of the ore above. We are not advised that when this is done if they will crosscut the ledge to find its width. This work attracts considerable attention. It is expected that the ore vein will be found to be wider and richer than that on the 200-foot level. In Hale & Norcross they are working on the 300-foot level and also sinking a winze to the 400-foot level. In Savage, Gold & Curry, Best & Belcher and Con. Virginia the work is the same as heretofore reported by us. That in Gould & Curry is being closely watched by mining men.

From the Bodie district our advices are essentially unchanged. Work is continued on several levels in Mono, Standard, Bulwer and Bodie. The three latter are raising a few tons of ore each week, but not sufficient to meet current expenses.

The market opened this morning dull and barely steady at last night's closing bids. After Call there was a slightly firmer feeling which soon gave way under cross-orders for lower prices. Chollar closed at $2.35 at noon; Potosi at $1.05. The shares of the north end mines held fairly steady, as did those of the Gold Hill mines. The points are out for still lower figures on Chollar. Reliable advices received to-day from the Brunswick lode state that in running the south drift on the 300-foot level, they ran into and out of the ore at several points and as they went south the ore widened and gained in value. At one point it was six feet wide with an average assay value of $60 to the ton. This is a large increase in width and value on that found on the 200-foot level, and makes mining men outspoken in the belief that it is proving to be a mine. The vein runs in a zigzag way, while the drift is run straight. After the drift has been extended still further, crosscutting will be commenced. If the ore gains on the 400-foot level as it gained on the 300-foot level over the 200-foot level, then they have a large ore body which ought to return dividends if properly handled; even as it is, the showing is most gratifying.

The following illustrates the changes of the week:

Mines.	July 30.	Aug. 6.
Alpha	$ 15	.....
Alta Consolidated	.....	.....
Andes	31	$ 31
Belcher	40	33
Best & Belcher	60	88
Bodie	.....	.....
Bullion	21	.....
Challenge	50	40
Chollar	2 85	2 50
Confidence	1 15	1 00
Consolidated California and Virginia	1 80	1 75
Consolidated New York	.....	.....
Crown Point	40	34
Exchequer	05	05
Gould & Curry	78	68
Hale & Norcross	1 35	1 15
Justice	.....	.....
Mexican	60	60
Ophir	.....	1 05
Overman	.....	.....
Potosi	1 40	1 15
Savage	78	68
Sierra Nevada	.....	53
Union	48	46
Utah	11	.....
Yellow Jacket	43	37

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alpha Con M & M Co, Nev	17	10c	Aug 3.	Sept 7..Sept 29	C E Elliott, 309 Montgomery
Belcher S M Co, Nev	53	25c	Aug 5.	Sept 10..Sept 30	C L Perkins, Mills Building
Anita G M Co, Cal	10	7c	July 20.	Aug 25. Sept 15	L F Reichling, 404 Montgomery
Best & Belcher M Co, Nev	60	25c	July 2.	Aug 6..Aug 27	M Jaffe, 309 Montgomery
Bullion Con G M Co, Cal	8	15c	June 16.	July 20..Aug 11	C A Grow, Mills Building
Channel Bend M Co, Cal	3	5c	June 23.	July 31..Aug 22	J P Langhorne, 39 Sutter
Confidence S M Co, Nev	27	30c	July 30.	Sept 3..Sept 24	A S Groth, 414 California
Con Imperial M Co, Nev	37	1c	July 24.	Aug 27..Sept 22	C L McCoy, Mills Building
Gold Bar Con M Co, Cal	4	2c	July 13.	Aug 20..Sept 21	E C Godfrey, Crocker Bldg
Jamison M Co, Cal	8	5c	July 6.	Aug 15..Aug 31	Sam W Cheyney, 120 Sutter
Kentuck Con, Nev	12	5c	June 16.	July 22..Aug 12	Aug Waterman, 309 Montgomery
Marguerite G M & M Co, Cal	3	10c	June 18.	July 28..Aug 28	Chas. Winters, 237 Twelfth

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
North Pacific Mining & Transportation Co.	E D Farish, 632 Market	Aug 17

San Francisco Stock Board Sales.

SAN FRANCISCO, August 6, 1896

9:30 A. M. SESSION.

200 Andes	31	400 Gould & Curry	68
600 Belcher	33	50 H. & N	1 15
200 Best & Belcher	88	300 Mexican	60
100 Challenge	40	300 Occidental	60
950 Chollar	2 50	200 Ophir	1 05
50 Confidence	1 00	100 Potosi	1 15
500 Con Imperial	02	100 Union	46
500 Crown Point	34	200 Yellow Jacket	37

SECOND SESSION—2:30 P. M.

400 Gould & Curry	65	500 Yellow Jacket	36
200 Best & Belcher	84	300 Belcher	33
200 Con Cal & Va	1 75	1000 Sierra Nevada	53
800 Savage	68	100 Union	46
600 Chollar	2 35	300 Occidental	55
300 Potosi	1 05	300 Bulwer	26
300 H. & N	1 10	200 Exchequer	05
600 Crown Point	34		

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ANNUAL MEETING—The regular Annual Meeting of the stockholders of the North Pacific Mining and Transportation Company will be held at the office of the Company room 5, No. 632 Market St., San Francisco, California, on Monday, the seventeenth (17th) day of August, 1896, at the hour of 1 o'clock p. m., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Wednesday, August 12th, at 3 o'clock p. m.

E. D. FARISH, Secretary.

Office—Room 5, No. 632 Market street, San Francisco, California.

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JULY 28, 1896.

564,818.—SEWING MACHINE—F. M. Batchelor, Portland, Or.
564,955.—TROLLEY WHEELS—Brunswick & Johnson, Los Angeles, Cal.
564,737.—IGNITER FOR GAS ENGINE—T. G. Cantrell, S. F.
564,509.—CAR FENDER—P. P. Donahoo, S. F.
564,905.—FRUIT HOLDER—T. S. Fitch, S. F.
564,750.—NUT LOCK—J. C. Holloway, S. F.
564,823.—BOTTLE CLOSURE—W. Laudahn, Port Angeles, Wash.
564,827.—CAR FENDER—P. E. Law, Santa Barbara, Cal.
564,897.—PUMP—F. Orton, S. F.
564,769.—GAS ENGINE—H. Swain, S. F.
564,851.—CAR AXLE BOX—A. A. Weber, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

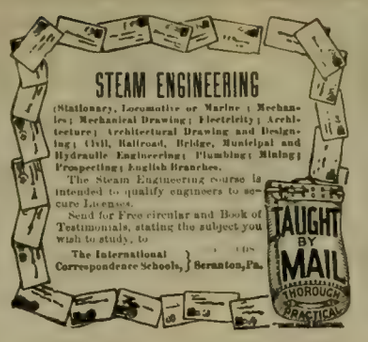
Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

NUT-LOCK—James C. Holloway of San Francisco, Cal. No. 564,750. Dated July 28, 1896. This nut-lock consists of a sheet of metal having wings provided with integral supplemental lugs on opposite sides, said wings and lugs being cut from within and out of the body of the blank and contained within the outer wall or edge thereof, the wings being adapted to be bent to engage two of the side walls of the nut and said lugs are to be bent horizontally at right angles to the wings to engage the other side walls of the nut.

IGNITER FOR EXPLOSIVE-ENGINES.—Thomas G. Cantrell of San Francisco, Cal. No. 564,737. Dated July 28, 1896. The object of this device is to provide such connections for the yielding rigid electrode that will not be subjected to injurious influences but may be wholly outside of the cylinder and within reach, and even within sight, so that their operation may always be observed. To this end the device consists in connection with a rigid electrode, a grooved foot in which it is adjustably fitted, a stem carrying the foot and passing outside of the cylinder, a flat faced lug upon said stem outside of the cylinder, a laterly projecting sliding pin, having a head in contact with the flat faced lug, and a spring impinging against the end of the pin, to hold its head in contact with the lug.

CAPT. GILLETTE has sent the annual report of the California Debris Commission to the War Department at Washington, D. C. He reports that owing to the lack of funds the commission was able to carry on only a small part of its duties from January 31, 1896, to the close of the fiscal year. In accordance with the opinion of the Attorney-General, the commission has, since the date of its last annual report, called the attention of the owners and operators of thirteen mines which were being worked illegally to the requirements of the law and the duties of the commission in the matter. So far as known these mines have been closed, and in two cases applications have subsequently been made to the commission for permits to mine. No report has been received from the United States District Attorney as to the progress of the injunction suit requested by the commission on December 4, 1894, against the North Bloomfield Mining Company. Since the organization of the commission 224 applications to mine have been received. Of these, 160 permits to mine have been granted, four permits have been canceled and twenty-five permits at different times suspended temporarily, generally on account of the owners neglecting to comply with the instructions concerning impounding works or from accidents to those works. Several dams or impounding works have been broken or otherwise damaged, but with one exception only small quantities of material escaped in the navigable streams. This was the dam of the Omega mine in Scotchman's creek, Nevada county, which broke owing to the caving in of an old wooden shaft built before the dam authorized by the commission was constructed. Its breaking permitted the escape of about 1,000,000 cubic yards of material impounded some years ago, and upon which an authorized dam had been constructed. The total amount of material mined under permits during the year is estimated at 915,372 cubic yards. The available storage provided at present and partially or wholly completed for future operations is estimated at 8,000,000 cubic yards. No dam for impounding detritus in larger streams has as yet been authorized by the commission. Owing to lack of funds the commission has not yet been able to give any attention to the subject of the improvement of rivers, but with the funds now available they expect to make the necessary examinations to determine if there is any feasible project for the improvement of rivers compatible with the permission of hydraulic mining. It is expected that the funds now available will permit of this work and also to carry on the ordinary work of the commission to the close of the fiscal year ending June 30, 1897.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Walter Shackleford, in the Jack's Ranch Mine, near Meadow Valley, Plumas Co., to deposit tailings in an old pit; from J. F. Cowdery, in the Sacket's Gulch Claim, near St. Louis, Sierra Co., to deposit tailings in a ravine; and from Cadematori & Peirano, in the Barnhardt Mine, near San Andreas, Calaveras Co., to deposit tailings in Grub Gulch, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on August 24th, 1896, at 1:30 P. M.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Assessment Notices.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Little Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 8) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 31st day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of July, 1896, an assessment (No. 4) of Two cents (2c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 38, Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of August, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 21st day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

CONSOLIDATED IMPERIAL MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors held on the 24th day of July, 1896, an assessment (No. 37) of One (1c) Cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 35, third floor Mills Building, corner of Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 27th day of August, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on TUESDAY, the 22d day of September, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. MCCOY, Secretary.

Office—Room 35, Third Floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

BELCHER SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 5th day of August, 1896, an assessment (No. 53) of twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 37, third floor, Mills Building, N. E. corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of September, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on WEDNESDAY, the 30th day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. PERKINS, Secretary.

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The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis. The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO. { SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.

The mills require very little attention. At our mill an ordinary peon," earning one dollar per day, has complete charge.

In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY. { EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY. { EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY. { S. BAMBERGER, President and Manager. SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,

[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO. { C. C. McIVER, President; D. CUSHMAN, Secretary. MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

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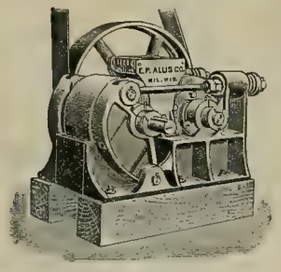

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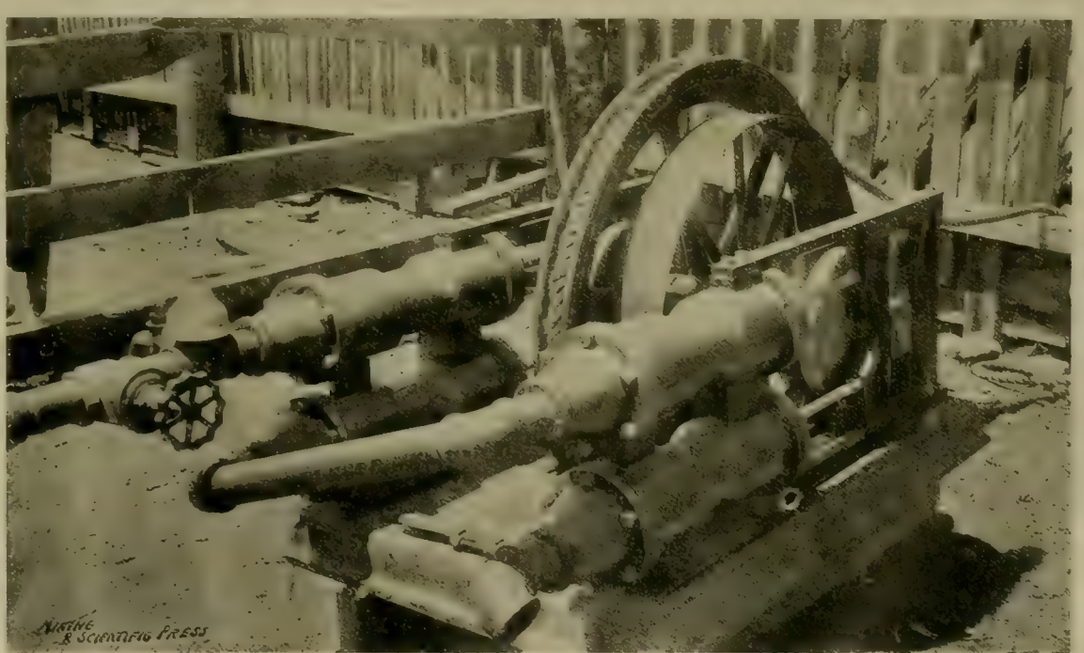
MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1884.—VOLUME LXXIII. Number 7. SAN FRANCISCO, SATURDAY, AUGUST 15, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Something New in Water Power.

The accompanying cut represents a hydraulic engine invented and patented by Dr. A. J. Collar of Yreka, California. It is believed to be an entirely new method of working water in cylinders for the purpose of generating power. It has neither cutoffs nor slides, but takes water through the cylinders in an unbroken column, and is provided with pistons intended to apply the force of the water directly to the crank pins when they are near their quarter, or perpendicular, position, and divides the circle described by the crank pin equally between the four pistons. The one crank pin following another at 90°, the same as a locomotive, and the pistons being free from pressure for 45° each side the dead center, the evils of a dead center are considered to be avoided. The positions of the cylinders are such that the thrust of the piston rod is always in nearly a direct line with the crank pin when each piston is at work. When the engine is once filled with water there is no vacuum formed about any of the pistons, and no loss of water in avoiding the dead center (something unavoidable in using a cutoff engine with water as the motive power). Each piston is furnished with a valve in its center, which opens toward the current and is thrown open when the valve pin comes in contact with the down-current end of the cylinder, and is closed when its pin comes in contact with the up-current end of the cylinder, while a small snap holds the valve in position last taken. The cylinders have a brass lining and the pistons a metal packing ring, which can be renewed when worn. The crank pins are furnished each with a block which works up and down in the slot in the crosshead on rows of steel balls, making a joint with less friction than connecting rods would make. This machine is claimed by the inventor to show greater efficiency than any water-using device known. They are especially adapted to hoisting, as water need only be used when raising the load. A throttle reverses the engine, and when reversed the throttle is closed, closing both feed and discharge, when the cage or bucket descends at a speed according to the will of the operator without using any water, but taking advantage of the dead water in the cylinders as a water break. These engines run backward as well as forward. A point of value in these machines, where small ones are to be used in upstair shops and offices, is the efficiency of the discharge pipe when carried down to the sewer; the suction of the discharge-pipe makes the engine as efficient as though placed in the basement. The same holds true with the discharge pipe in all large engines where the pipe can be carried down a few feet below the location of the engine. As these machines allow no water to escape when stopped from any cause, they should be valuable for pumping water from mine shafts or wells, where it can be done by water power. With a float and brake they are self-regulating, pumping water when it is there in sufficient quantity and standing still when there is not enough to require pumping. As the engine uses a given amount of water for each revolution, regardless of pressure, a cyclometer placed on the shaft registers the exact amount used, a valuable consideration to any one purchasing water for power. Their simplicity of construction admits of their manufacture at very reasonable prices. The inventor has two of these engines built, and says they show a remarkable efficiency. One is a 2 H. P. and the other a 15 H. P. The lighter one is built to use 11 inches of water with 70 feet pressure, and the stronger one to use 4 inches of water with 1200 feet pressure. Either one will use a smaller quantity or less pressure to good advantage. One of these engines has a governor of peculiar construction, which it obeys instantly, varying the feed according to the work done, showing them to be well adapted to use under varying amounts of work and able to retain a uniform speed.



A NEW HYDRAULIC ENGINE—A RECENT CALIFORNIA INVENTION.

Home Products Exposition.

In two weeks begins the 29th Industrial Exposition of the Mechanics' Institute of this city, this time under the joint auspices of the Mechanics' Institute and the Manufacturers' and Producers' Association of California. It is worth the attention of every one who recognizes the value of the manufacturing industry to this city and its present untoward condition.

Time was when San Francisco and California had no factories—simply exported and imported. That era passed and a season of activity in manufactures ensued. With the exception of the business of making mining machinery, there is a present general depression in nearly every line. It is not within the limits or the scope of this article to discuss the causes, simply to suggest the great industrial importance of the matter. In the general welfare the amount of business done does not always indicate its value. An importer can do a business of a million dollars a year with three clerks and an office boy; a manufacturer turning out that amount would have a big establishment employing 400 men and supporting 100 families who would buy all they ate and wore, pay rent or taxes, and 90% of the million dollars would be spent in the community. The improved morals of an employed man over an idle one is also a point of some value, not in a religious way, but as an economic proposition. It costs less to run a city whose inhabitants are employed than one infested with enforced idleness. Every dollar spent in fostering home industries comes back multiplied by one hundred, and it is time for Californians to realize this. There is considerable present grumbling about dull times and low prices, and corner orators have voluble statements regarding overproduction and want of consumption, single-tax, the rights and wrongs of the individual. With all this is needed State loyalty, home patriotism, common-sense realization of facts. The surroundings are in every way most favorable; not with the stars, but with ourselves lies the solution of industrial difficulties. This State and coast could be made self-supporting. The matter need not run into politics, as most things do with us. It is purely a business question and the men at the head of the coming exposition have gone at the only common-sense solution of the problem. It is for all concerned to advocate this and practice as well as preach the doctrine of substantially encouraging home production.

Every man who makes any good thing on this coast that he expects to sell should show it at the September exposition in the Mechanics Pavilion. Especially should all industrial and manual trades and handicrafts be represented. There is no charge for exhibition, space, power, steam or water. Awards and cash premiums will be given. The larger success of this matter will be commensurate with the interest displayed by those who are most interested in its success—the people who want to sell what they make to the home market, which is always the best market.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, August 15, 1896.

TABLE OF CONTENTS.

ILLUSTRATION.—A New Hydraulic Engine—A Recent California Invention, 129.
EDITORIAL.—Something New in Water Power; Home Products Exposition, 129. Apparent Requirements in Mining Enterprises; Sale of a Famous Mine; A Supreme Court Decision, 130.
SCIENTIFIC PROGRESS.—International Boundary Line; Heliographic Signals; What Mountain Ranges Are; The Highest Peak on the Western Hemisphere, 133.
MECHANICAL PROGRESS.—Hollow Instead of Solid Shafting; Steel Storage Tanks for Grain; Turning Trees into Newspapers; An Instrument to Arrest Bleeding in Surgical Operations; Largest Lock in the World, 133.
ELECTRICAL PROGRESS.—Niagara Falls Power Transmission; The Rod Type of Trolley, 133.
PRACTICAL INFORMATION.—Carbolic Acid and Glycerine for Bruises or Sores; Fruits Washed and Peeled Before Eating; Meteorites; Recipe for Rheumatism; Inflammable Gas; To Bore a Hole in a Sheet of Thin Glass; Curious Application of Roentgen Rays; Remedy for Corns; First Railway in the World; A Great Speed, 134.
MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 138-9.
THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 146.
MISCELLANEOUS.—Concentrates, 131. Duty and Sampling of Lead Ores; Current Copper Statistics; A Secretary of Mines; A Scheme to Build a Ship Canal, 132. How He Ships His Bullion; Recently Declared Mining Dividends; California Mines and Miners, 134 Coast Industrial Notes; Personal; Commercial Paragraphs; Recent California Mining Incorporations, 140. Notices of Recent Patents; Obituary, 147.

Sale of a Famous Mine.

It is reported that the Mulatos mine, in Mexico, has been sold by the Aguayo brothers to English capitalists, who have been for some time making mill tests and other examinations of the property. This mine attracted the attention of the mining world through the suit brought in 1890 by Hayward & Hobart to recover $1,575,000, the price they had purchased the mine for, on the ground that it had been "salted."

The Mulatos has been examined frequently in the past by Californians. Samuel Fergusen and McGaskill some twelve or fifteen years ago looked at it for J. B. Haggin. A. J. Bowie examined it a little later and then Alexis Janin. Subsequently Alexis Janin and D. B. Gillette went down for the Exploration Company of London. Again, Alexis Janin and D. B. Gillette, aided by Louis Janin Jr. as assayer and surveyor, made a further examination for the same company. As a result of this the property was rejected, but not because of a belief in salting, or with a knowledge of salting, but for reasons not made public. Two years after that—in 1889—Hayward & Hobart were induced to take hold of it, and for the first time work was begun systematically. Hayward's superintendent, Montgomery, an experienced miner, ran the mill, and found that he could get but about $1 per ton from the ore. Before they took hold of it, and after its examination by Gillette and Janin, a cave had covered up most of the best body of ore.

The result of Montgomery's work was so poor that it led to the belief that the mine had been "salted." This was subsequently proved to the satisfaction of Hayward, who took steps to recover his money. He got out with a loss of about $300,000. The mine has lain idle now several years. Recently R. R. Symon, in connection with people in England, took hold of it and had it re-examined by Fred H. Harvey of Galt. His report has not been made public.

This mine undoubtedly has had in the past seams of exceedingly rich ore, and has also lost part of a good body by a cave. The ore-bearing ground is very extensive, but what the value of it is no one seems to know.

With the knowledge of the Treadwell mines in Alaska paying big dividends out of ore carrying $3 per ton, those who have considered the methods believed that with the still cheaper labor that may be obtained in Mexico a big mine could be developed.

This is another case of a big mine that has made a name and cannot be downed. If the Comstock were closed for twenty years it would be opened up again. Old stories of hidden ore bodies and other legends would crop up and grow as the years pass. Prospectors are still hunting for the Pegleg and Gunsight mines, lured on by the tales that loom out of the dim past. Many miners are more willing to heed these mythical stories than listen to the cold-blooded statements of conservative men of what they have seen and know.

Once give a big mine a good name and it never dies. It may be closed down and deserted, but always some one can be found ready to take hold of it for what it has been. The maxim about giving a dog a bad name will not apply. It is fortunate that this is so, or many a bullion producer in California that was worked in early days and then deserted would never have been reopened.

A Supreme Court Decision.

A recent case decided by the Supreme Court of this State has attracted considerable attention. The full text of the decision is given herewith:

FORECLOSURE LIEN FOR LABOR PERFORMED ON A MINING CLAIM.

Appeal from Superior Court of Shasta County.

P. Donohoe, Plaintiff and Respondent,
vs.
The Trinity Consolidated Gold and Silver Mining Company, et als., Defendants; Bank of Shasta County Appellant.

Appeal from the judgment and from the order denying a new trial.

Plaintiff's action was to foreclose a lien for the value of labor performed upon the mining claim of the Trinity Mining Company. The bank was made defendant as claiming some interest in the property, which interest, it was averred and not denied, was subordinate to plaintiff's lien. The mining company suffered default. The bank answered, admitting all of plaintiff's allegations, saving that it denied plaintiff's employment, his labor, its value and non-payment.

The labor, its value, and non-payment, were proved and no question arises upon any of these matters. Plaintiff had alleged that he was employed as a miner by one Bernard McCourt, the duly authorized foreman and agent of the mining company. Upon the trial he undertook to establish this by proving that McCourt was appointed foreman by one Champion, who was the superintendent in charge under authority of the Trinity Consolidated Company. This company it is admitted by the pleadings was incorporated under the laws of the Territory of Utah, with its principal place of business in Ogden. The admissibility and sufficiency of the evidence to establish these agencies of Champion and McCourt are made the contention upon this appeal, presented under objections to the reception of the evidence and also by attacks on the findings based upon it.

The evidence adduced by plaintiff was the following: The plaintiff testified that McCourt employed him. McCourt was acting as foreman, and McCourt himself and Champion, the superintendent, both told him that McCourt was foreman. Champion acted as superintendent and told witness that he was superintendent. He had no other knowledge that Champion had been authorized to act as superintendent by the company. McCourt testified that he was employed to act as foreman by Champion and did so act, with authority to employ and discharge laborers. He employed plaintiff as a miner. Champion was superintendent. Acting as superintendent, he purchased and shipped quartz mill machinery to the mine; caused a 10-stamp mill to be erected and crushed the ore extracted from the mine in this mill. Champion also posted notices about the mine and on the mill to the effect that the Trinity Company was the owner of the property. He knew of Champion's authority only from statements and from his actions as superintendent. James E. Isaacs testified that Champion had repeatedly told him he was managing agent and superintendent of the corporation. He had examined the record of conveyances of property, and of proceedings in a suit against the company brought by the defendant Shasta Bank. This suit was for money had and received. The complaint averred that Champion was the vice-president and managing agent and as such was doing business by authority and direction of the Trinity Company. In this action the Shasta Bank accepted a waiver of the issuance of a summons and an acknowledgment of service of and the amended complaint on behalf of the Trinity Company, defendant therein, from Champion, who described himself "as managing agent and superintendent" of the corporation. And upon this admission entered the default of the mining company, took judgment and sold the property. It is admitted that the Utah company did own the property. There was introducted in evidence the record of a lien filed by Champion against the company for a sum due him for services as superintendent and managing agent. There was introduced records of location of water ditches and rights, and mining claims made by the company through Champion its agent.

Nothing further was established by plaintiff. And the evidence indisputably fails in showing direct authority from the company to Champion, or a direct ratification of Champion's acts. The situation then amounts to this: A foreign corporation owns mines in this State. In its name work is commenced upon these mines. Its so-called superintendent buys costly machinery, constructs a mill, extracts and reduces ore, employs miners, mill men and laborers; takes up water rights and mineral claims; enters into contracts; borrows money; acknowledges service of process in a civil action to collect this money; and in general by word and act holds himself out and conducts himself as the duly and regularly appointed superintendent of the company.

It is unquestionably true that an agency may not generally be established by the declarations and acts of the alleged agent; but without discussing the question whether this evidence would be sufficient to establish an ostensible agency by reason of the failure of the mining corporation to exercise ordinary care (C. C., 2317), it is clear that, under the provisions of our mechanic's lien law, evidence of these acts and declarations is permitted to establish *prima facie* such agency. Section 1183 of the Code of Civil Procedure gives to the miner a lien for labor done at the instance of the owner of the building or his agent; "and every contractor, sub-contractor, architect, builder *or other person* having charge of any mining, or of the construction, alteration, addition to or repair, either in whole or in part, of any building or other improvement, as aforesaid, shall *be held to be the agent* of the owner for purposes of this chapter." These open declarations and continued acts of Champion and McCourt were thus admissible in evidence under this section to show the person in charge of the mining. By the rule of evidence declared by section 1183, this showing, if not dispelled or overcome, *prima facie* established the agency. It is quite true that the owner, or other person in interest, might overthrow this by proof of his want of knowledge and non-employment of the alleged agent, coupled with a showing that he had exercised ordinary care in the premises; but in this case no one seeks to overcome it. The mining company made default, and the bank's claim is also founded upon the sufficiency of the agency of Champion—the very identical agency which, against this miner with a claim of eighty-four dollars for labor, it is disputing and seeking to overthrow.

No counter evidence having been introduced, it follows that the evidence of plaintiff, standing uncontradicted, supports the findings of the court.

The judgment and order appealed from are therefore affirmed. HENSHAW, J.

We concur:
TEMPLE, J.
MCFARLAND, J.

THE apparent requirements in mining enterprises are often of a character not wholly contemplated with satisfaction by peaceably inclined men. On the 30th ult. a meeting of the Matabeleland Development Co. was held in London, England, to discuss the advisability of spending $25,000 in butchering the South African natives. That was not the wording of the resolution, but is its import. The "gun fights" in Nevada, when men reckless of the future but careful of aim got $20 per diem and all expenses to hold sundry mining property, were small affairs in the way of a mining investment compared with the sanguinary appropriation which after some philanthropic discussion was carried by the board of directors of the Matabeleland Development Co. on the 30th ult. "To suppress the revolt in Rhodesia" is what the money is for; it will be turned over to the British South Africa Co. which, among other mining requirements, finds it necessary now and then to exterminate troublesome natives. As a cold-blooded business proposition, the action of the directors was upheld by the manifest exigencies of the occasion. The amusing part of it is the effort to justify the matter in a burst of "patriotism," "manifest destiny," etc. No one said "these vermin infest a country that we have seized and which contains gold that we must have. They oppose us and must be killed." "Divine Providence," "the rights of the conqueror," and the stupidity and intolerable impudence of the natives who objected to the British Company enforcing its assumptive decrees, were referred to as justifying extreme measures. One letter was read beginning "When the company, in the exercise of its undoubted rights as conquerors, called for 45 per cent of the king's cattle, and God, in his inscrutable wisdom, determined upon destroying by rinderpest the remaining 55." Of course, after that there was nothing more to be said. The protests of those who said it was "an enormous butcher's bill" were drowned in a roar of disapprobation and the resolution was passed "by an overwhelming majority." The appropriation will doubtless prove a paying investment.

Concentrates.

AN upward movement in Merced stock is one of the fall probabilities.

THE Carson, Nevada, river is so low that the mills have closed for the season.

CHICAGO merchants are importing Mexican silver dollars and putting them in circulation.

GRAVEL going 8 cents to the pan is being washed out in the principal street of Helena, Montana.

A BOAT propelled by a gasoline engine now runs on the Colorado river from The Needles to El Dorado canyon.

SPOKANE, WASH., will send two carloads of ore, concentrates, specimens, etc., to the St. Paul and Minneapolis exhibition next month.

THE derailment last Sunday of an ore train and a smash-up causes the temporary closing of the Morning mines, in the Cœur d'Alenes, Idaho.

A SCOTCH syndicate has paid $1,500,000 for the Diamond Hill property at Townsend, Montana, and will put an additional 100 stamps in the mill.

A COMBINATION is being formed in Swansea to import and treat Australian sulphide ores by a new patent process, in which sulphate of soda is largely used.

NO ANNUAL REPORT has been issued this year by the State Mining Bureau, and it will be some months before the thirteenth of the series will be published.

LATEST advices from Leadville, Col., report that the strike is still on. The manager of the Bohn mine says he is ready to start at the old wage rate—$2.50 per day.

THE Portland Mining Company at Cripple Creek claims to have the largest hoisting plant in Colorado with a capacity for raising 10,800 pounds of ore 4500 feet per minute.

THE plans and specifications for the Government sampling works to be constructed at Northport, Wash., are ready and bids will shortly be advertised for the letting of the contract.

OF the mining companies registered in British Columbia up to last March three were capitalized at $5,000,000, twenty-three at a million or over and thirty-five at half a million or over.

T. J. MURRAY of Leadville, Colorado, has been in Silver City, N. M., hiring men at $3 per day, and paying their expenses to Leadville to take the places left vacant by striking miners.

SIMONS, MAXWELL AND BAER of Leadville, Colorado, have bought the Ben Shinar mine, Klamath river, near Thompson's creek, Siskiyou Co., Cal., for $15,000, and will build four miles of ditch and flume.

A CONTRACT has been let by the owners of the Gwin mine, Calaveras Co., for the erection of a 40-stamp mill. The new shaft sunk by the present owners has involved an expenditure of nearly $90,000 and is down to a depth of 1300 feet.

THE following advertisement appears in a Redding, Cal., paper: "Placer mine, 2 claims, coarse gold, garden and small orchard well fenced, 200 feet of sluices, mining and other tools, clear title, for sale on account of departure for only $65."

THE new mill for the Golden Gate, Utah, Mining Co., will have a capacity of 400 tons daily, and is expected to cost $200,000. The calculation is that the entire cost of handling the ore, including treatment, will not exceed $2 per ton.

THE tsetse fly of South Africa finds its counterpart in the "gray flies" and "green head" flies at Salmon River and Stanley Basin, Idaho, which kill horses and cattle and have driven all the miners and prospectors out of that region.

THE United States Surveyor General of Washington, advertises for bids for running standard township sections and meander lines on unsurveyed lands in that State. For this purpose $40,000 has been set aside to be expended this year.

THE killed and wounded in the Rand, South Africa, gold mines in '95 aggregated 685; of these 300 were killed. It should not be forgotten, says the South African *Mining Journal*, that the ignorance, stupidity and drunkenness of the natives are responsible for the excessive death rate.

RAYBOLD & GREGORY, of Salt Lake, are trying to rent the old Richmond Smelting Works at Eureka, Nevada, to work some of the gold of that section. Thirty years ago anyone leaving Nevada had to pay a tax of $1 for the privilege. Were that law in force during the last fifteen years the State treasury would have been enriched.

THE coal companies of Alabama have adopted a proposition made by the miners of 40 cents per ton minimum, based on iron at $8.50 per ton, and for every 50 cents advance 2½ cents, until the minimum price of $10.50 is announced, after which 2½ cents on every dollar advance. The contract took effect July 1st and is for one year instead of two years, as heretofore.

A RECENT decision of the California Supreme Court is to the effect that a county recorder could keep the fees paid him for recording mining claims. On page 401 of the session laws of 1891, applying to the class of counties as Kern for instance, is a paragraph saying that the recorder shall keep a record of all mining claims recorded and shall turn the fees received therefor into the county treasury.

PATENTS have been issued by the general land office to the Northern Pacific Railroad Company for 28,019.74 acres of land in Stevens county, Washington. Protests have been filed to cover a number of mining claims located in that vicinity, but the patents are for lands advertised, and not protested. There are, however, mineral claims on these lands on behalf of which the owners had failed to file protests.

RUSSELL HOWLAND, an English mining engineer, is enthusiastic over some Georgia gold property that he has been examining, and says the ore at Tallapoosa and Villa Rica is richer than that of South Africa. He tells of the Georgia "mother lode" called the "Dahlonega belt," and says that it would be profitable to build "a big stamp mill every ten or fifteen miles through Cherokee and Lumpkin counties."

THE director of the mint has prepared a statement that as the full existing mint facilities of the country do not exceed an annual coinage of silver dollars exceeding $40,000,000, fourteen years would be consumed in replacing with silver dollars the $485,000,000 gold in circulation, supposing the latter is drawn away to Europe, as has been predicted would follow the free coinage of silver, and additional minting facilities are not provided.

REFERENCE to the Trinity Co. letter from one of our traveling correspondents indicates what is being done in that section in the way of mining, and is a good answer to the question, "What are you folks doing in California?" The Trinity county miners, besides having good ground to work in common with all California, have an advantage over some placer sections of the State in the fact that they are not vexed or hampered by the anti-debris restriction problem.

ALL the Bonanza King property at Providence was sold last week under execution to J. H. West, Needles, Cal. It included 15,000 tons of tailings, a 20-stamp mill and the King mine. The company at one time placed a valuation of $250,000 on the tailings, but the fall in silver bullion makes them almost valueless at this time. The Bonanza King has produced over $2,000,000 in dividends.

THE Roseburg, Oregon, U. S. land office has instructions from Washington to give notice of hearings in the matter of sixty specific protests filed by mineral-land claimants against the patenting of O. & C. R. R. lands in Jackson and Josephine counties, Or. The evidence will be taken before different officials in the two counties, and the Register and Receiver will then render the decisions.

THE Anti-Debris Association pays its manager $200 per month; has another official who gets $300 per month and so on. No one in the State Miners' Association gets anything for his personal services, some of the hardest workers even paying their own expenses. During the year ending June 30, '96, one of the liveliest county mine associations in the State—Placer Co.—collected and disbursed $822.51, of which $655 was sent to the State Association, all at an expense of $33 60.

CONCERNING numerous samples of asbestos from northern California, Oregon and Washington, local manufacturers and dealers in asbestos goods say that a great quantity is being mined now, and where two years ago they paid from $50 to $60 per ton at the quarries, they can now buy it for $7 or $8 per ton. As a commercial proposition, the quality and extent of the deposit, facility of getting it out and transportation rates would largely determine the feasibility of mining it in all cases.

SOME side lights are furnished on some British mining methods by an editorial warning in the current issue of the London *Mining World*, against the practice of directors in gold mining companies demanding commissions from mining machinery manufacturers, and who refuse to vote for the orderb eing placed with a manufacturer unless they are paid a commission. One London contemporary correctly says: "If mining machinery is to be ordered on 'tips' and not on merits, it is high time investors should know it."

THE hoisting works of the Poulin mine, at Butte, Montana, were destroyed by fire last Sunday, involving a loss of $10,000 and narrowly missing a great loss of life. Six men were at the bottom of the shaft, 1100 feet below the surface, sinking at the time, and a pumpman was at the 1000 foot level. The foreman went down on a cage, gave an alarm and got the six men out. All were drawn to the surface. Just as the cage cleared the opening of the shaft, the men all jumped and landed in safety on the platform. Almost at the same instant the rope burned through and the cage fell to the bottom.

IN U. S. mints an alloy of one-tenth copper is used in coins to harden them and make them less susceptible to abrasion. In England the amount of alloy is less—only one-twelfth. Recently a controversy arose among the mint officials of London as to which coins, English or American, would last the longer. In order to put the matter to a test two small steel cylinders were fixed on a revolving rod and one filled with United States and the other with British coins. All of the letters, milling, reading, etc., were worn from the English coins twelve hours before they were effaced from the American coins.

THE Government has commenced the survey of the Blackfoot reservation in Montana, which the Indians last fall agreed to sell for $1,500,000. The land is said to contain mineral. Legends of rich finds made in years gone by have spread the belief that the strip abounds in gold, silver and copper. As mining legends, like all others, lose nothing in retelling, the large number of prospectors who are now camped on the outskirts of the reservation, waiting for the completion of the survey, may be somewhat disappointed. There is no doubt that copper ledges do exist, and some gold has been found, and altogether the prospects are good for developing a mining district, but hardly as rapidly as the "sooners" expect.

W. A. CARLYLE, geologist for British Columbia, has examined the Trail creek mines, and says between there and the Sudsbury district in Ontario he finds a remarkable similarity, with the exception that there is no nickel in the ores of Trail, while that metal and copper have constituted the value of the former, the nickel more particularly bringing them into prominence. He says he has found the same iron cap over the veins of Trail, the same iron sulphides and copper pyrites. He says that the veins are true, and, while there are great bodies of ore in sight, development of the mines has scarcely commenced. He thinks the country is one of vast possibilities, but a great deal depends upon the method of treating the ore.

A COMPARISON of the wear and tear of shoes and dies shows that at the Homestake, South Dakota, mine shoes wear at the rate of from 36 to 37 pounds per 100 tons of ore, and the dies at the rate of 44 to 48 pounds. This represents a cost of about 2 cents per ton, at the prices which the Homestake company pays, as compared to 4 cents at Angels Camp, 5½ cents in Gilpin county, Colorado, 4½ cents at Bendigo and 5⅝ cents at Clunes, Australia, 9 cents at Grass Valley and 13 cents at Mammoth, Arizona. These figures depend considerably on prices and freights. The following is a statement of wear in pounds of iron per 100 tons of ore: At Angels Camp, 45 pounds; Grass Valley, 90; Gilpin county, 58; Bendigo, 144; Clunes, 157; Mammoth, 76; Homestake 80½.

E. F. TURNER of Adelaide has filed specifications of a process for the regenerative treatment of argentiferous sulphide ore, in which process the raw sulphide ore is disintegrated by the action of hydrochloric acid (HCl), resulting in the formation of metallic chlorides, which are subsequently fused and the metals recovered, and in the production of sulphuretted hydrogen, which is used as fuel, and the products of its combustion utilized for the production of fresh supplies of HCl. He claims that from the sulphuretted hydrogen so produced not only are fresh supplies of HCl obtained during the process by the treatment of sodium chloride with the sulphur dioxide (SO_2), resulting from the use of the H_2S as fuel, but also from the sodium chloride certain by-products in the form of caustic soda and other soda products are obtained. Portions of such products are used for the recovery of the metals from the aqueous chlorides obtained in the first part of the process.

THE reopening of old abandoned mining properties and their profitable operation has become so familiar a matter in California as to cease to elicit much comment. The same thing occurs everywhere in this country where gold mining is or has been carried on. In addition, thousands of new gold locations and as many more old mines have been revivified and are adding to the output. Rimini district, Montana, is a case in point. The Broadwater had long been abandoned. This month it is being reopened, and by September 1st 150 men will be at work and $75,000 begun to be expended on machinery. The Peerless Jennie, in the same district, one of the oldest mines in Montana, long abandoned but now being worked, is another illustration. Years ago picked ore from this mine was packed on mules to Omaha and shipped to Germany for treatment. New processes, better transportation and the great law of supply and demand now make it worth while to resume operations.

THE publication of the list of California mines and miners, their number, location, characteristics, post office address of owners and superintendents, etc., draws to a close. It was begun April 25th and will, probably, be concluded this month, except some addenda, corrections, etc. It constitutes a directory of the mining properties of California, incomplete, but "a starter" in that direction. From the totals it appears that there are about 2700 mines and nearly 16,000 miners or men employed therein, not including Chinese, who usually work on their own account in abandoned hydraulic claims. Probably no similar number of men in any industrial pursuit anywhere add more, daily or annually, to the world's real wealth than those thousands of California miners, whom this journal feels honored in representing.

NICKEL is reported discovered on the headwaters of the Cowlitz river, in western Washington. A dispatch says "the vein is 100 feet wide, and the ore in sight is reported to be worth millions," which is unlikely. The geological formation of that section is not considered favorable to the existence of nickel, though it is possible that deposits may be found worthy of serious commercial consideration. Josephinite, an alloy of nickel and iron, has been found in Josephine Co., Oregon, and deposits of nickeliferous pyrrhotites discovered in Jackson and Douglas counties in that State, some silicious ores near Riddles, in the latter county, carrying 8% nickel, but their remoteness and cost of reduction has so far militated against the commercial value of the find. Some of the ore from the newly discovered Washington nickel deposit has been tested at the Tacoma Smelting Works with alleged satisfactory result.

LAST Saturday at Angels, Cal., W. Wiber, a miner at the Utica, while watching carpenters putting in some timbers at a manway, fell into the manway a distance of 150 feet. Death was instantaneous. At Butte, Mont., the same day W. Robinson, a miner employed at the Rose mine, and W. Burke, a miner at the Rarus, were instantly killed, the former by falling down a shaft and the latter by a fall of rock. Advices from Alaska tells an unusual form of death for a miner who, at the head of Turnagain Arm, Cook's Inlet, with a party of prospectors was crossing the glacier. A thin sheet of ice secreted a crevice in the crossing. The ice gave way, precipitating two men into the chasm, scarcely 3 feet in width. One, who was carrying a gun, saved himself by using it as a crossbar. The other, named Cenneah of Seattle, Wash., fell to the bottom, 80 feet. He was tightly jammed in the crevice between the ice. The others tied blankets together and attempted to pull him out, but he was so tightly jammed that he could not be moved.

REGARDING sundry samples of infusorial earth "electro-silicon," etc., received during the week from Arizona, Nevada and Lower California, it is to be said that they appear to be of some commercial value in the manufacture of dynamite—giant powder. The San Francisco manufacturers use considerable and would undoubtedly give the preference to home products if price and quality were satisfactory. One giant powder man interviewed, said he had had sampled and analyzed 1328 different lots sent him at various times from all over the coast and had yet to get satisfactory results as to quantity and quality. If the right kind of infusorial earth could be sent to this city in carload lots the San Francisco manufacturers could probably use twenty-five carloads a month. At present the companies manufacturing explosives in the vicinity of this city import the absorbent from Germany, an earth that costs them from $40 to $50 per ton. There is a constant demand for the particular kind of earth used, as the sales of giant have increased three-fold since the recent activity in mining.

AT HORSEFLY, Cariboo, B. C., the California hydraulic elevator is meeting all the local requirements of placer workings The hydraulic work by giant or monitor is done precisely as in any other hydraulic mine. The elevator must be fitted to conditions. Additional water is required to elevate the gravel and material, including the water used in hydraulicking. If the giant or monitor is discharging 500 inches of water at a gravel bank, as much water must pass through the elevator as is necessary to overcome the mass of water and gravel discharging from the sluice on to the elevator or, when 500 inches of water runs onto the elevator with its additional accumulation of gravel, from 800 to 1200 inches of water must discharge upwards from the elevator. The height to which it is raised is then entirely dependent on the amount of pressure from the sand box; a pressure of 300 feet would be adequate to raise 50 to 65 feet, the friction occasioned taking away some of the force. It is not usually understood that the hydraulic elevator obviates the use of a pump to keep the pit clear of water, for it is really a siphon.

WRITING from Trinity Co., Cal., concerning ways and means of hydraulic mining in that section, a correspondent of this paper says: "A peculiar feature used in this end of the State to assist the placer and hydraulic miner is what is known as a 'shooter.' It consists of an automatic reservoir, of various sizes and shapes, that collects all the water not run through the 'giants' or 'monitors' for say fifteen minutes (as in the case of this mine), and then a valve automatically opens of sufficient size to allow all the water thus collected to escape in five minutes, thus obtaining the use of over 20,000 inches of water for five minutes that 2000 inches has furnished by cacheing it for fifteen minutes. I saw the above force of water carry boulders weighing over 500 pounds through one mile of flume in five minutes. Nearly every hydraulic mine in these northern counties is equipped with one of these 'shooters.' On the Boss & McClary placer mine, adjoining Trinity Center, the 'shooter' box is 20x40 feet square and 6 feet deep, with an automatic opening of 18 inches by 4 feet. They have a bedrock flume 6 feet wide by 3 feet deep, nearly half a mile long, lined with 9-inch blocks."

"WHAT does an ounce of silver cost to produce?" is a question often asked and answered, the answer being rarely rational, so much depending on the point of view. One Eastern authority says it can be produced for five cents an ounce, that all a miner has to do is to build a fire at the base of a cliff and melt the bullion out of the ore right there. He also states that while engaged in this primitive pastime the miner can live on five cents a day. Another authority declares that silver can be produced profitably at 65 cents per ounce. The latter estimate seems based on statistics furnished by big concerns, where silver is a bye-product of the smelter and is an incidental output of the work. It is impossible for anyone acquainted with any of the facts to give even an approximate idea of what an ounce of silver costs to produce. Of course, anyone unacquainted with the matter can say whatever his fool fancy suggests. The writer has worked where every ounce of silver produced cost $5, and again where there was a handsome profit at going prices. There are individual cases where gold can be and is produced at a cost of 50 cents an ounce. Yet ,probably every ounce of gold produced on this continent has in the aggregate, taking all things into consideration, cost $20.67. To take one special case as a basis to compute the cost of silver production is a specious and unfair method of reasoning, narrow and grossly misleading. Were it possible to sum up all the money and the value in money of the time spent, it is probable that every ounce of silver produced in the United States has cost $1.29.

Duty and Sampling of Lead Ores.

O. B. WISE, in *Mining*.

British Columbia has a valuable ally in the United States in promoting the smelting industry, as is shown by the recent acts of Congress and ruling of the Treasury Department. Whatever may have prompted the movement, it has certainly stimulated the smelting industry in the province. The reduction in the tariff on lead from 1½ cents per pound to ¾ of a cent stimulated the development in the silver-lead mines in both the East and West Kootenays. Even the few low-grade properties began or contemplated operation. But suddenly the smelters were informed that ore carrying a greater value in lead than in silver would be taxed for the total tonnage rather than on the lead contents. Following this is the act which passed Congress in May establishing Government sampling works at Bonner's Ferry, Idaho, and Northport, Washington, through which all British Columbia lead ores must pass and be sampled. Not less than one-fifth of the shipment in each case must pass through the sampler.

Now let us look at the present situation and the effect that such ruling and acts will produce. The situation in British Columbia for the past few years has brought about results which to-day are approximately as follows: There are three smelters in operation in the province, two of which were built and are owned by citizens of the United States. Only one of the three to-day is smelting lead ore, but the other two contemplate adding lead stacks. The mines of the province have been discovered and developed more largely by Americans than by all others combined, and Americans are almost alone in the desire to purchase and develop silver-lead mines, Canadian and European capital preferring gold mines. True, some Canadian capital is invested in the silver-lead mines of the province, but it is greatly in the minority, and it may truly be said that American money and American brawn are the greatest factors in the development of the silver-lead industry of British Columbia. The same is true of the smelters.

Under the ruling of the United States Treasury Department, a carload of ore shipped from these mines to a smelter in the United States and containing 1200 pounds of lead, having a value of 3 cents per pound, and fifty ounces in silver, worth 68 cents per ounce, would present the following value to the producer, without counting deductions for mining, freight and treatment, but deducting for duty:

CONTENTS—ONE CAR OR TWENTY TONS ORE.

1200 pounds lead per ton (24,000 pounds lead per car, at 3c)	$ 720
50 ounces silver per ton (1000 ounces 68c)	680
Value per car of twenty tons	$1400

DEDUCTIONS.

Duty on lead (24,000 pounds)	$ 108
Duty on silica, and gangue	72
Duty—¾c per pound on total contents, or 40,000 pounds	$180

As there is nothing said in the bill about taxing the silica or other gangue matter contained in lead ores, it appears to an observer that the honorable secretary has taken it into his own hands to levy duty and declare imports. This ruling would not seem so peculiar if it had a precedent, or if all lead ores were taxed for the full contents; but if the owner of a mine in the same district should be so fortunate as to have a few or many more ounces in silver to the ton of ore, and were able to pay this silica tax, he would not be compelled to do so; for did this ore contain but four ounces more silver per ton, and no more lead, the values of each metal being the same as in example above, then the silica tax would be removed and the miner would be a gainer thereby to the amount of $72 per carload.

Below I give an example of the American protection to Canadian industries. The owner of the mine the ore of which is shown in the above example, has an opportunity to avoid the silica tax in part or in whole by having his ore treated on the Canadian side, because the tax on bullion is but ¾ of a cent on each pound of the lead contained therein. He takes a carload to the Canadian smelter but a few miles distant, and built by an American to treat the ores of an American miner in British Columbia, with the result that he saves the $72, or he can afford to divide that amount with the smelter and still be gainer, and in no fear of the silica tax. But, fearing that the bonus which the Canadian Government is giving the smelters in British Columbia is not sufficient, and that the honorable Secretary of the United States Treasury has but half done his duty, now comes the United States Congress and enacts a law which accomplished two results, disastrous to the interests of the United States citizens, it is true, but aiming no doubt to assist the people of British Columbia in the establishment of home industries. A bill is passed by Congress making two points along the Canadian border ports of entry for lead ore, and at which points all lead ores entering this country from the Kootenays must be sampled. This takes one railroad out of the field of competition on ores entering the United States from these points and also compels the mine owner to have all crude ore sampled at one or the other of these works, located respectively on the Spokane Falls & Northern Railroad at Northport, Washington, and on the Great Northern Railway at Bonner's Ferry, Idaho. It must not be understood that this sampling is to be done gratis, for nothing, for such is not the case. A fair compensation for this work will not be less than $5 per carload of twenty tons, or 25 cents per ton. It will also, if operative, succeed in removing the most economical means of transportation—the Canadian Pacific Railway Company. I say "if operative" because it is only fair to presume that the Canadian Pacific Company will make some effort to control a fair share of the business in its own territory, and that they will succeed may be presumed.

I feel sure that the act and ruling above cited to, in addition to what they already accomplished for the Canadian people, will result in the establishment of a smelter at Vancouver or some other seaport in British Columbia, where fuel is cheap, and the product may be transported by water to any part of the United States at a low cost, without sampling obstructions and without duty on silica. That once accomplished, the large silver-lead ore tonnage which is being handled by the several railroads from those mines will almost entirely cease.

Current Copper Statistics.

Under date of New York, August 4, 1896, Houston & Co. write concerning copper:

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February	8,296	3,450	4,846
March	10,892	3,914	6,978
April	10,684	5,677	5,007
May	10,481	5,430	5,051
June	9,797	8,600	1,197
July	10,409	6,035	4,374
Total seven months	68,727	40,250	28,477

European copper statistics by cable to-day show the total visible supply of copper to be 34,180 tons, being a reduction since July 15th of 1080 tons and 2120 tons decrease since July 1st. European deliveries for the month of July were 19,500 tons.

The London market for G. M. B. copper closed to-day at £49 2s 6d spot and £48 17s 6d futures. Sales amount to 375 tons spot and 550 tons futures.

The domestic market closes 11¼ asked for Lake, with sales at 11 15/100 spot, 11 for electrolytic and 10⅝@10¾ for casting.

A Secretary of Mines.

The MINING AND SCIENTIFIC PRESS is advocating anew the advisability of adding to the Cabinet a Secretary of Mines. The growing importance of the mineral industry would seem to warrant the addition. The objection offered to the departure by many that the magnitude of the mining industry does not warrant it, is based chiefly on the assumption that it would be in the field of precious minerals only that the executive would devote his entire time and attention. It is scarcely possible that such an important office would be established to cater to any special branch of the industry, but if the coal and iron as well as the copper, silver, lead and gold mines were to amalgamate their interests in an endeavor to create this new department, the showing they could make of the value of their products and the number employed would be so great as to demand some substantial consideration. Once established the work of the department could be so segregated under competent hands that the value to each branch of the industry would be quite as great as if the office was created solely in behalf of the precious mineral contingent. The proposition is worth advocating. The MINING AND SCIENTIFIC PRESS occupies an enviable position in the public mind and is therefore well able to lay the matter before the powers that be.—Sonora Democrat.

CHICAGO engineers are pushing a scheme to build a ship canal to connect the Calumet river at its mouth with the new drainage at Sag Bridge, at a cost of $10,000,000. This would complete a belt line of water way around the city.

Scientific Progress.

International Boundary Line.

From the north comes an unlikely statement that errors had been discovered in the running of the forty-ninth parallel, which, if corrected, would throw the mining district of Rossland, B. C., into the United States. Such an error is not probable.

In establishing an international boundary line, it is usual for each Government to be represented by competent engineers, and for the line to be run by astronomical observation. Straight lines on parallels of latitude are determined by observation of the stars, usually the Pole star. If the axis of the earth were strictly in the direction of this star it would be a simple matter to carry along this angle, for at every point in this parallel line the angle made by the earth's horizon with the extended axis of the earth must be the same. But the axis of the earth projected does not point directly to the Pole star, but it has a slight variation, and twice each day the axis of the earth is in a line with the star in the daily revolution of the earth. These variations are computed by astronomers for the use of surveyors. If a transit line is run, taking a right angle with the due north line, the tendency is to run off towards the equator, because the parallel line is a circle, and each point in this circle is not an exact right angle with the line towards the pole. In order to arrest this tendency to go too far southward geographers have calculated a table of offsets for each chain, mile, or other distance, and this correction is made as frequently as necessary. This, together with the astronomical observation, makes it practically impossible that any serious error should creep in. In the United States Government surveys the solar compass is used, and by a reflection of the sun's image on the horizon of the instrument the latitude is established at all times.

There have been numerous alleged discoveries of errors in the international boundary. A few years ago it was stated that a strip of land in Whatcom county, Wash., belonged to British Columbia. No attention was paid to the matter by either Government, both being satisfied that when a line was run and the reports accepted the line was there to stay.

SERGEANT GORDON, in charge of the heliograph station at Bisbee, Arizona, engaged in sending daily heliograms to San Bernardino, has produced what is believed to be a new experience. It has always been assumed that it was not possible to flash heliographic signals across any stretch of country if there were any precipitation between the two instruments. On July 18th Sergeant Gordon was engaged in sending a message to the station at the Silver Creek range, both he and the receiving station having full, bright sunshine, when it suddenly began to rain between them, the storm seeming to cover almost half the width of the Sulphur Spring valley, and as it finally passed across the field of the instruments the fast-falling rain was so dense as to entirely obliterate every vestige of the hills at the receiving station and for miles in each direction. As the message was important the sergeant decided to try if he could send the remainder through the rain. He accordingly went on flashing the rest of the message as though he had clear sunlight all the way, and at the conclusion was delighted to see the flash from the other heliograph come back to him saying "O. K." Then the two operators communicated back and forth through the rain until they settled beyond the peradventure of a doubt that the falling rain—so dense as to entirely conceal each station from the other, and miles in width—could not prevent the passage of the flashes of the heliograph.

MOUNTAIN RANGES are mere wrinkles on the surface of the earth. Scientifically, we measure these wrinkles by finding out how high they are above the sea level. There are two classes of mountains—the table and the folded mountains. As to the individual points or peaks, which are the highest, they are of two classes—those which are volcanic and those which have defied weathering or denudation. When the country was raised above the sea there was a natural slope toward the oceans, and the water from the melted snows or the rivers cut through the land. The water shed then was plowed by these streams. There used to be held, in accordance with the Murchison idea, the general theory that mountains were mainly due to cracks which took place in the earth's surface in remote periods, but this idea is no longer entertained. As to form of mountain, the one known as table mountain finds the best example at the Cape of Good Hope. It is believed that this mountain is due, not to upheaval, but to the sinking of the surrounding districts. Why these peculiarly defined areas did not sink is based on the theory that the ground under them cooled before the rest of the section, and so the table mountain had an earlier foundation, and has long retained its place. There always would be denudation, however, but proportionate with its surroundings, and so, being higher at the start, it still keeps to its approximate elevation.

ACONCAGUA, the highest peak on the Western hemisphere, is to be attempted again next month by E. A. Fitzgerald, who explored the New Zealand Alps. If he succeeds in getting to the top, which is 23,200 feet above sea level, he will beat the highest mountain-climbing record—W. M. Conway's 22,600 feet ascent of Pioneer peak in the Himalayas. Dr. Gussfeldt has tried Aconcagua, but got into trouble with his guides and had to turn back 2000 feet from the summit. Mr. Fitzgerald will have in his party the Swiss guide Zurbriggen, who accompanied him in New Zealand and was with Conway in the Himalayas.

Mechanical Progress.

Hollow Instead of Solid Shafting.

A bar of iron in a machine may be subjected to any one of three different kinds of strain: a lengthwise pull, unequal pressures which would bend it, and a twist. A piece of shafting, on which there are two pulleys, one deriving power from an engine and the other imparting it to a heavy machine, is often made to undergo this third sort of strain. It has long been recognized that greater rigidity is secured if the same amount of metal is put in tubular form than in a solid rod. That is why a bicycle frame is made of tubing. The various portions are less likely to bend than if the steel is compact. Similarly a shaft would stand a torsional, or twisting, strain much better if the material composing it were arranged in a tube. This being the case, it may seem strange that hollow shafting has not already come into extensive use. The principle is not at all new. But certain mechanical difficulties, which would not affect bicycle construction, have been encountered in this other application of the idea. For instance, a pulley is sometimes fastened to a shaft by means of a bit of metal, called a key, wedged in between the two, a slight recess or seat being cut in the shaft and the inner surface of the wheel to receive it. Now, so long as the shaft is solid the key can be driven inward rather recklessly. But if the shaft were hollow it might spring a little under the pressure, and its shape might be distorted. It is coming to be recognized, however, that screw clamping bolts, running radially inward from the hub of a pulley, will grip the shaft as firmly as a key. The latter is pronounced needless by experts. A serious objection to the use of hollow shafting is therefore removed, and already the idea is coming into fashion.

STEEL storage tanks for grain are taking the place throughout the country of the old wooden elevators, and pneumatic tubes are used to convey the grain from the place of the storage to the mill, where formerly it was wheeled in barrows over bridges between buildings or through underground tunnels. The erection of air-tight steel storage tanks or bins for grain in place of the old wooden structures not only does away with all danger from fire, but it is claimed that it preserves the grain for an indefinite period of time, and also makes impossible the presence of weevils or other vermin so destructive to grain in storage.

There being no inflammable material used in the construction of these steel tanks there is no need of insurance, and mill men claim that within six or seven years the saving on insurance alone will more than pay for the first cost of construction.

Turning Trees Into Newspapers.

An interesting experiment was recently made at Menzel & Co.'s paper and wood pulp manufactory at Elsenthal to ascertain what was the shortest space of time in which it was possible to convert the wood of a standing tree into paper, and the latter into a journal ready for delivery.

Three trees were felled in a forest near the establishment at thirty-five minutes past 7 A. M., in the presence of two of the owners of the manufactory and a notary whom they had called upon to certify as to the authenticity of the experiment. These trees were carried to the manufactory, where they were cut into pieces 12 inches in length, which were then decorticated and split. The wood thus prepared was afterward raised by an elevator to the five defibrators of the works. The wood pulp produced by these machines was then put into a vat, where it was mixed with the necessary materials. This process finished, the liquid pulp was sent to the paper machine. At thirty-four minutes past 9 in the morning the first sheet of paper was finished. The entire manufacture had thus consumed but one hour and fifty-nine minutes.

The owners of the manufactory, accompanied by the notary, then took a few of the sheets to a printing office situated at a distance of about two and a half miles from the works. At 10 o'clock a copy of the printed journal was in the hands of the party; so that it had taken two hours and twenty-five minutes to convert the wood of a standing tree into a journal ready for delivery.

During the course of the manufacture there occurred a few interruptions which might be avoided at another time, and that, in the opinion of the two manufacturers, had it not been for this twenty minutes might have been gained.

AN instrument, intended for the arrest of bleeding in surgical operations, has been perfected by Lawson Tait. A platinum wire, arranged to carry a current of electricity, is inclosed in the blades of a pair of steel forceps or any other requisite instrument, the wire being insulated by a bed of burnt pipe clay. A current of suitable voltage is turned on, the artery seized and compressed, and in a few seconds the tissues and arterial walls are so agglutinated that the passage of blood is rendered impossible. The temperature employed is about 180° Fahrenheit, so that it will be seen that the principle is fundamentally different from that of electrical cauterizing instruments.

AT Sault Ste. Marie, Mich., on the 3d inst., the 800-foot lock was opened at 10:39 o'clock, two steamers being "locked" through. No official programme marked the opening of the largest lock in the world and the completion of one of the greatest engineering feats in the history of the country. The lock was commenced in 1889. It is 800 feet in length between the gates, and 1100 feet in length over all, 43 feet high, 100 feet wide, and will accommodate boats drawing 21 feet of water.

Electrical Progress.

Niagara Falls Power Transmission.

The first step toward the actual transmission of the power of Niagara Falls over any considerable distance has been made, and Buffalo will be the first city to benefit by it. By November 4th, '96, the cars of the Buffalo Railway Company will be driven by the electricity generated at the power house by the side of the great cataract, and the transmission of its power over a long distance will have become an accomplished fact. The system of transmission employed is the three-phase system, developed by the engineers of the General Electric Company; the transmission can be thus effected over three wires. In the two-phase, four wires would be used to convey the same amount of power. The contracts were made between the Cataract Construction Company supplying the electricity and the General Electric Company, and between the latter company and the Buffalo Power and Conduit Company controlling the supply and distribution of the Niagara power in Buffalo, and the Buffalo Railway Company.

The contract with the Cataract Construction Company covers three of the air-blast type transformers. These will be the largest transformers ever constructed, and will step-up the Niagara 2200-volt two-phase current to either 11,000 or 22,000 volts three-phase. Any two of the transformers together will deliver 2500 H. P.; the third is a spare one. It is the intention of the Cataract Construction Co. to commence transmission operations at 11,000 volts, and later to increase the capacity of their transmission system by increasing the potential to 22,000 volts. The transformers will be designed and insulated to withstand the latter pressure. The pole line will be erected by the White-Crosby Co., and will have capacity sufficient to transmit 40,000 H. P.

For transforming the power down and converting it into that suitable for street railway purposes the Power and Conduit Co. purchased four static transformers of about 360 H. P. each and two 500 H. P. rotary converters. The transformers will reduce from the line potential of either 11,000 or 22,000 volts to 400 volts, at which voltage the three-phase current will be turned into the rotary converters and then converted into direct railway current of 550 volts. The latter will be compound wound, and will operate in multiple with the steam-driven generators, supplying the balance of the power necessary for the operation of the railway system. They will be of the iron-clad type with steel frames, with collector rings for the three-phase current at one end and a commutator for the direct current at the other. They will have six poles and will run at 500 revolutions per minute, and are similar to that placed in the Niagara power house to furnish current to the Buffalo & Niagara Falls Railroad.

The Rod Type of Trolley.

The name "trolley," originally and properly applied only to a trailing grooved wheel at the end of a pole, afterward became synonymous with an electrically propelled car, because it was by means of such a wheel that nearly all such vehicles obtained their supply of current from the overhead wire. In order to evade the patent on that device, however, a revolving rod (or slender cylinder) is substituted for the wheel on many European roads. The rod is 18 or 20 inches long and slides to and fro as the car rocks, goes around curves or meets switches. Contact with the source of electricity is thus preserved effectually. It is not necessary, therefore, to provide the pole at its base with means for swinging sideways. The up and down motion is sufficient for all practical purposes. As with the present style of trolley, this new one is forced upward against the wire by means of springs connected

Duty and Sampling of Lead Ores.

O. B. WISE, in *Mining*.

British Columbia has a valuable ally in the United States in promoting the smelting industry, as is shown by the recent acts of Congress and ruling of the Treasury Department. Whatever may have prompted the movement, it has certainly stimulated the smelting industry in the province. The reduction in the tariff on lead from 1½ cents per pound to ¾ of a cent stimulated the development in the silver-lead mines in both the East and West Kootenays. Even the few low-grade properties began or contemplated operation. But suddenly the smelters were informed that ore carrying a greater value in lead than in silver would be taxed for the total tonnage rather than on the lead contents. Following this is the act which passed Congress in May establishing Government sampling works at Bonner's Ferry, Idaho, and Northport, Washington, through which all British Columbia lead ores must pass and be sampled. Not less than one-fifth of the shipment in each case must pass through the sampler.

Now let us look at the present situation and the effect that such ruling and acts will produce. The situation in British Columbia for the past few years has brought about results which to-day are approximately as follows: There are three smelters in operation in the province, two of which were built and are owned by citizens of the United States. Only one of the three to-day is smelting lead ore, but the other two contemplate adding lead stacks. The mines of the province have been discovered and developed more largely by Americans than by all others combined, and Americans are almost alone in the desire to purchase and develop silver-lead mines, Canadian and European capital preferring gold mines. True, some Canadian capital is invested in the silver-lead mines of the province, but it is greatly in the minority, and it may truly be said that American money and American brawn are the greatest factors in the development of the silver-lead industry of British Columbia. The same is true of the smelters.

Under the ruling of the United States Treasury Department, a carload of ore shipped from these mines to a smelter in the United States and containing 1200 pounds of lead, having a value of 3 cents per pound, and fifty ounces in silver, worth 68 cents per ounce, would present the following value to the producer, without counting deductions for mining, freight and treatment, but deducting for duty:

CONTENTS—ONE CAR OR TWENTY TONS ORE.

1200 pounds lead per ton (24,000 pounds lead per car, at 3c)	$ 720
50 ounces silver per ton (1000 ounces 68c)	680
Value per car of twenty tons	$1400

DEDUCTIONS.

Duty on lead (24,000 pounds)	$ 108
Duty on silica, and gangue	72
Duty—¾c per pound on total contents, or 40,000 pounds	$180

As there is nothing said in the bill about taxing the silica or other gangue matter contained in lead ores, it appears to an observer that the honorable secretary has taken it into his own hands to levy duty and declare imports. This ruling would not seem so peculiar if it had a precedent, or if all lead ores were taxed for the full contents; but if the owner of a mine in the same district should be so fortunate as to have a few or many more ounces in silver to the ton of ore, and were able to pay this silica tax, he would not be compelled to do so; for did this ore contain but four ounces more silver per ton, and no more lead, the values of each metal being the same as in example above, then the silica tax would be removed and the miner would be a gainer thereby to the amount of $72 per carload.

Below I give an example of the American protection to Canadian industries. The owner of the mine the ore of which is shown in the above example, has an opportunity to avoid the silica tax in part or in whole by having his ore treated on the Canadian side, because the tax on bullion is but ¾ of a cent on each pound of the lead contained therein. He takes a carload to the Canadian smelter but a few miles distant, and built by an American to treat the ores of an American miner in British Columbia, with the result that he saves the $72, or he can afford to divide that amount with the smelter and still be gainer, and in no fear of the silica tax. But, fearing that the bonus which the Canadian Government is giving the smelters in British Columbia is not sufficient, and that the honorable Secretary of the United States Treasury has but half done his duty, now comes the United States Congress and enacts a law which accomplished two results, disastrous to the interests of the United States citizens, it is true, but aiming no doubt to assist the people of British Columbia in the establishment of home industries. A bill is passed by Congress making two points along the Canadian border ports of entry for lead ore, and at which points all lead ores entering this country from the Kootenays must be sampled. This takes one railroad out of the field of competition on ores entering the United States from these points and also compels the mine owner to have all crude ore sampled at one or the other of these works, located respectively on the Spokane Falls & Northern Railroad at Northport, Washington, and on the Great Northern Railway at Bonner's Ferry, Idaho. It must not be understood that this sampling is to be done gratis, for nothing, for such is not the case. A fair compensation for this work will not be less than $5 per carload of twenty tons, or 25 cents per ton. It will also, if operative, succeed in removing the most economical means of transportation—the Canadian Pacific Railway Company. I say "if operative" because it is only fair to presume that the Canadian Pacific Company will make some effort to control a fair share of the business in its own territory, and that they will succeed may be presumed.

I feel sure that the act and ruling above cited to, in addition to what they already accomplished for the Canadian people, will result in the establishment of a smelter at Vancouver or some other seaport in British Columbia, where fuel is cheap, and the product may be transported by water to any part of the United States at a low cost, without sampling obstructions and without duty on silica. That once accomplished, the large silver-lead ore tonnage which is being handled by the several railroads from those mines will almost entirely cease.

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January	8,168	7,144	1,024
February	8,296	3,450	4,846
March	10,892	3,914	6,978
April	10,684	5,677	5,007
May	10,481	5,430	5,051
June	9,797	8,600	1,197
July	10,409	6,035	4,374
Total seven months	68,737	40,250	28,477

European copper statistics by cable to-day show the total visible supply of copper to be 34,180 tons, being a reduction since July 15th of 1080 tons and 2120 tons decrease since July 1st. European deliveries for the month of July were 19,500 tons.

The London market for G. M. B. copper closed to-day at £49 2s 6d spot and £48 17s 6d futures. Sales amount to 375 tons spot and 550 tons futures.

The domestic market closes 11¼ asked for Lake, with sales at 11$\frac{15}{100}$ spot, 11 for electrolytic and 10⅝@ 10¾ for casting.

A Secretary of Mines.

The MINING AND SCIENTIFIC PRESS is advocating anew the advisability of adding to the Cabinet a Secretary of Mines. The growing importance of the mineral industry would seem to warrant the addition. The objection offered to the departure by many that the magnitude of the mining industry does not warrant it, is based chiefly on the assumption that it would be in the field of precious minerals only that the executive would devote his entire time and attention. It is scarcely possible that such an important office would be established to cater to any special branch of the industry, but if the coal and iron as well as the copper, silver, lead and gold mines were to amalgamate their interests in an endeavor to create this new department, the showing they could make of the value of their products and the number employed would be so great as to demand some substantial consideration. Once established the work of the department could be so segregated under competent hands that the value to each branch of the industry would be quite as great as if the office was created solely in behalf of the precious mineral contingent. The proposition is worth advocating. The MINING AND SCIENTIFIC PRESS occupies an enviable position in the public mind and is therefore well able to lay the matter before the powers that be.—Sonora Democrat.

CHICAGO engineers are pushing a scheme to build a ship canal to connect the Calumet river at its mouth with the new drainage at Sag Bridge, at a cost of $10,000,000. This would complete a belt line of water way around the city.

Scientific Progress.

International Boundary Line.

From the north comes an unlikely statement that errors had been discovered in the running of the forty-ninth parallel, which, if corrected, would throw the mining district of Rossland, B. C., into the United States. Such an error is not probable.

In establishing an international boundary line, it is usual for each Government to be represented by competent engineers, and for the line to be run by astronomical observation. Straight lines on parallels of latitude are determined by observation of the stars, usually the Pole star. If the axis of the earth were strictly in the direction of this star it would be a simple matter to carry along this angle, for at every point in this parallel line the angle made by the earth's horizon with the extended axis of the earth must be the same. But the axis of the earth projected does not point directly to the Pole star, but it has a slight variation, and twice each day the axis of the earth is in a line with the star in the daily revolution of the earth. These variations are computed by astronomers for the use of surveyors. If a transit line is run, taking a right angle with the due north line, the tendency is to run off towards the equator, because the parallel line is a circle, and each point in this circle is not an exact right angle with the line towards the pole. In order to arrest this tendency to go too far southward geographers have calculated a table of offsets for each chain, mile, or other distance, and this correction is made as frequently as necessary. This, together with the astronomical observation, makes it practically impossible that any serious error should creep in. In the United States Government surveys the solar compass is used, and by a reflection of the sun's image on the horizon of the instrument the latitude is established at all times.

There have been numerous alleged discoveries of errors in the international boundary. A few years ago it was stated that a strip of land in Whatcom county, Wash., belonged to British Columbia. No attention was paid to the matter by either Government, both being satisfied that when a line was run and the reports accepted the line was there to stay.

SERGEANT GORDON, in charge of the heliograph station at Bisbee, Arizona, engaged in sending daily heliograms to San Bernardino, has produced what is believed to be a new experience. It has always been assumed that it was not possible to flash heliographic signals across any stretch of country if there were any precipitation between the two instruments. On July 18th Sergeant Gordon was engaged in sending a message to the station at the Silver Creek range, both he and the receiving station having full, bright sunshine, when it suddenly began to rain between them, the storm seeming to cover almost half the width of the Sulphur Spring valley, and as it finally passed across the field of the instruments the fast-falling rain was so dense as to entirely obliterate every vestige of the hills at the receiving station and for miles in each direction. As the message was important the sergeant decided to try if he could send the remainder through the rain. He accordingly went on flashing the rest of the message as though he had clear sunlight all the way, and at the conclusion was delighted to see the flash from the other heliograph come back to him saying "O. K." Then the two operators communicated back and forth through the rain until they settled beyond the peradventure of a doubt that the falling rain—so dense as to entirely conceal each station from the other, and miles in width—could not prevent the passage of the flashes of the heliograph.

MOUNTAIN RANGES are mere wrinkles on the surface of the earth. Scientifically, we measure these wrinkles by finding out how high they are above the sea level. There are two classes of mountains—the table and the folded mountains. As to the individual points or peaks, which are the highest, they are of two classes—those which are volcanic and those which have defied weathering or denudation. When the country was raised above the sea there was a natural slope toward the oceans, and the water from the melted snows or the rivers cut through the land. The water shed then was plowed by these streams. There used to be held, in accordance with the Murchison idea, the general theory that mountains were mainly due to cracks which took place in the earth's surface in remote periods, but this idea is no longer entertained. As to form of mountain, the one known as table mountain finds the best example at the Cape of Good Hope. It is believed that this mountain is due, not to upheaval, but to the sinking of the surrounding districts. Why these peculiarly defined areas did not sink is based on the theory that the ground under them cooled before the rest of the section, and so the table mountain had an earlier foundation, and has long retained its place. There always would be denudation, however, but proportionate with its surroundings, and so, being higher at the start, it still keeps to its approximate elevation.

ACONCAGUA, the highest peak on the Western hemisphere, is to be attempted again next month by E. A. Fitzgerald, who explored the New Zealand Alps. If he succeeds in getting to the top, which is 23,200 feet above sea level, he will beat the highest mountain-climbing record.—W. M. Conway's 22,600 feet ascent of Pioneer peak in the Himalayas. Dr. Gussfeldt has tried Aconcagua, but got into trouble with his guides and had to turn back 2000 feet from the summit. Mr. Fitzgerald will have in his party the Swiss guide Zurbriggen, who accompanied him in New Zealand and was with Conway in the Himalayas.

Mechanical Progress.

Hollow Instead of Solid Shafting.

A bar of iron in a machine may be subjected to any one of three different kinds of strain: a lengthwise pull, unequal pressures which would bend it, and a twist. A piece of shafting, on which there are two pulleys, one deriving power from an engine and the other imparting it to a heavy machine, is often made to undergo this third sort of strain. It has long been recognized that greater rigidity is secured if the same amount of metal is put in tubular form than in a solid rod. That is why a bicycle frame is made of tubing. The various portions are less likely to bend than if the steel is compact. Similarly a shaft would stand a torsional, or twisting, strain much better if the material composing it were arranged in a tube. This being the case, it may seem strange that hollow shafting has not already come into extensive use. The principle is not at all new. But certain mechanical difficulties, which would not affect bicycle construction, have been encountered in this other application of the idea. For instance, a pulley is sometimes fastened to a shaft by means of a bit of metal, called a key, wedged in between the two, a slight recess or seat being cut in the shaft and the inner surface of the wheel to receive it. Now, so long as the shaft is solid the key can be driven inward rather recklessly. But if the shaft were hollow it might spring a little under the pressure, and its shape might be distorted. It is coming to be recognized, however, that screw clamping bolts, running radially inward from the hub of a pulley, will grip the shaft as firmly as a key. The latter is pronounced needless by experts. A serious objection to the use of hollow shafting is therefore removed, and already the idea is coming into fashion.

STEEL storage tanks for grain are taking the place throughout the country of the old wooden elevators, and pneumatic tubes are used to convey the grain from the place of the storage to the mill, where formerly it was wheeled in barrows over bridges between buildings or through underground tunnels. The erection of air-tight steel storage tanks or bins for grain in place of the old wooden structures not only does away with all danger from fire, but it is claimed that it preserves the grain for an indefinite period of time, and also makes impossible the presence of weevils or other vermin so destructive to grain in storage.

There being no inflammable material used in the construction of these steel tanks there is no need of insurance, and mill men claim that within six or seven years the saving on insurance alone will more than pay for the first cost of construction.

Turning Trees Into Newspapers.

An interesting experiment was recently made at Menzel & Co.'s paper and wood pulp manufactory at Elsenthal to ascertain what was the shortest space of time in which it was possible to convert the wood of a standing tree into paper, and the latter into a journal ready for delivery.

Three trees were felled in a forest near the establishment at thirty-five minutes past 7 A. M., in the presence of two of the owners of the manufactory and a notary whom they had called upon to certify as to the authenticity of the experiment. These trees were carried to the manufactory, where they were cut into pieces 12 inches in length, which were then decorticated and split. The wood thus prepared was afterward raised by an elevator to the five defibrators of the works. The wood pulp produced by these machines was then put into a vat, where it was mixed with the necessary materials. This process finished, the liquid pulp was sent to the paper machine. At thirty-four minutes past 9 in the morning the first sheet of paper was finished. The entire manufacture had thus consumed but one hour and fifty-nine minutes.

The owners of the manufactory, accompanied by the notary, then took a few of the sheets to a printing office situated at a distance of about two and a half miles from the works. At 10 o'clock a copy of the printed journal was in the hands of the party; so that it had taken two hours and twenty-five minutes to convert the wood of a standing tree into a journal ready for delivery.

During the course of the manufacture there occurred a few interruptions which might be avoided at another time, and that, in the opinion of the two manufacturers, had it not been for this twenty minutes might have been gained.

AN instrument, intended for the arrest of bleeding in surgical operations, has been perfected by Lawson Tait. A platinum wire, arranged to carry a current of electricity, is inclosed in the blades of a pair of steel forceps or any other requisite instrument, the wire being insulated by a bed of burnt pipe clay. A current of suitable voltage is turned on, the artery seized and compressed, and in a few seconds the tissues and arterial walls are so agglutinated that the passage of blood is rendered impossible. The temperature employed is about 180° Fahrenheit, so that it will be seen that the principle is fundamentally different from that of electrical cauterizing instruments.

AT Sault Ste. Marie, Mich., on the 3d inst., the 800-foot lock was opened at 10:39 o'clock, two steamers being "locked" through. No official programme marked the opening of the largest lock in the world and the completion of one of the greatest engineering feats in the history of the country. The lock was commenced in 1889. It is 800 feet in length between the gates, and 1100 feet in length over all, 43 feet high, 100 feet wide, and will accommodate boats drawing 21 feet of water.

Electrical Progress.

Niagara Falls Power Transmission.

The first step toward the actual transmission of the power of Niagara Falls over any considerable distance has been made, and Buffalo will be the first city to benefit by it. By November 4th, '96, the cars of the Buffalo Railway Company will be driven by the electricity generated at the power house by the side of the great cataract, and the transmission of its power over a long distance will have become an accomplished fact. The system of transmission employed is the three-phase system, developed by the engineers of the General Electric Company; the transmission can be thus effected over three wires. In the two-phase, four wires would be used to convey the same amount of power. The contracts were made between the Cataract Construction Company supplying the electricity and the General Electric Company, and between the latter company and the Buffalo Power and Conduit Company controlling the supply and distribution of the Niagara power in Buffalo, and the Buffalo Railway Company.

The contract with the Cataract Construction Company covers three of the air-blast type transformers. These will be the largest transformers ever constructed, and will step-up the Niagara 2200-volt two-phase current to either 11,000 or 22,000 volts three-phase. Any two of the transformers together will deliver 2500 H. P.; the third is a spare one. It is the intention of the Cataract Construction Co. to commence transmission operations at 11,000 volts, and later to increase the capacity of their transmission system by increasing the potential to 22,000 volts. The transformers will be designed and insulated to withstand the latter pressure. The pole line will be erected by the White-Crosby Co., and will have capacity sufficient to transmit 40,000 H. P.

For transforming the power down and converting it into that suitable for street railway purposes the Power and Conduit Co. purchased four static transformers of about 360 H. P. each and two 500 H. P. rotary converters. The transformers will reduce from the line potential of either 11,000 or 22,000 volts to 400 volts, at which voltage the three-phase current will be turned into the rotary converters and then converted into direct railway current of 550 volts. The latter will be compound wound, and will operate in multiple with the steam-driven generators, supplying the balance of the power necessary for the operation of the railway system. They will be of the iron-clad type with steel frames, with collector rings for the three-phase current at one end and a commutator for the direct current at the other. They will have six poles and will run at 500 revolutions per minute, and are similar to that placed in the Niagara power house to furnish current to the Buffalo & Niagara Falls Railroad.

The Rod Type of Trolley.

The name "trolley," originally and properly applied only to a trailing grooved wheel at the end of a pole, afterward became synonymous with an electrically propelled car, because it was by means of such a wheel that nearly all such vehicles obtained their supply of current from the overhead wire. In order to evade the patent on that device, however, a revolving rod (or slender cylinder) is substituted for the wheel on many European roads. The rod is 18 or 20 inches long and slides to and fro as the car rocks, goes around curves or meets switches. Contact with the source of electricity is thus preserved effectually. It is not necessary, therefore, to provide the pole at its base with means for swinging sideways. The up and down motion is sufficient for all practical purposes. As with the present style of trolley, this new one is forced upward against the wire by means of springs connected

with the pole. The cylinder is mounted in the fork on dry ball bearings, inasmuch as the introduction of oil there might interfere with the flow of the the current. Oil is one of the best insulators known. As yet this type of trolley is but little used in America, although it was found desirable to introduce it on the Brooklyn & New York Bridge Railway for lighting purposes. It is probable, however, that in time it will come into service in this country for supplying power also to cars.

Practical Information.

SCARCELY a day passes that many persons do not, in some way or other, get a scratch, a small cut, or a bruise that may break the skin. In most instances not the slightest attention is paid to this beyond the temporary annoyance of the pain and the possible irritation when the hands are put into water, or some subsequent blow in the same spot brings an exclamation on account of the hurt. This, while a common practice, is by no means a wise one. The air is full of floating disease-germs, especially the air of cities and towns, and an injury of this sort, be it ever so slight, might furnish excellent breeding-ground for some deadly bacteria. It is a good plan always to keep a bottle of prepared carbolic acid and glycerine, and frequently touch all bruises or sore spots with it. This is one of the most convenient and effective germicides imaginable. It is said by excellent medical authority that the use of this preparation would prevent half of the contagious diseases that afflict the country. It is believed that many cases of fever and other serious ailments can be contracted by a floating germ coming in contact with the abraded skin. Once snugly lodged in this most congenial dwelling-place, the germ multiplies with amazing rapidity and soon overruns the entire system. Therefore, whenever there is a bruise or scratch, or any injury of this sort, germicidal applications should be at once resorted to.

ALL fruits with skins on should be washed and peeled before eating—especially fruits exposed on the streets, and where dust and flies can have access to them. Few are aware of the danger of food contamination by flies. They are great scavengers and are not at all choice as to what they eat, nor where they step. They pass at one bound from an infectious carcass, a foul ulcer, or a mass of diseased sputum or reeking filth to the apple, pear or peach, and, with dirty feet and dirty proboscis, run over it and contaminate it. Hence, all such fruit should be first washed and dried and then pared, if possible. Even food to be cooked ought, for cleanliness sake, to be washed if cooked with the skin on.

WHEN a very small meteorite enters our atmosphere it becomes incandescent and is visible for a short time as it moves along its path, constituting what is called a shooting star. When the meteorite is larger and when it becomes involved in a denser portion of the atmosphere, it presents the appearance of a brilliant planet; it is frequently followed by a train of greater or less extent, and oftentimes it explodes with more or less violence; it is then called a fire ball. When the meteorite is still larger it frequently escapes destruction in the atmosphere and falls to the earth, either as a unit, or, after one or more explosions, in fragmentary portions; the masses that reach the earth are called aerolites.

THE following recipe has been found specially effective in stubborn cases of rheumatism: One new egg well beaten, half a pint of vinegar, on ounce of spirits of turpentine, half an ounce of camphor. These ingredients must first be beaten together thoroughly, then put in a bottle and shaken for ten minutes, after which it should be corked tightly to keep out the air. In half an hour it will be ready for use. It should be applied three or four times a day, and for rheumatism in the head it should be rubbed on the back of the neck and behind the ears. It will keep for an indefinite time, and, in fact, is rather improved by age.

INFLAMMABLE gas that will readily ignite by the application of a match is sometimes found in the hollowed trunks of old trees. Some stories of "gas trees" have recently appeared in the public prints, and explanations offered that it is the ooze of natural gas from the reservoirs in the earth, penetrating these old tree trunks up through the ground. This is fallacious. Inflammable gas really does exist in many old trees, but it is of the trees' own manufacture from its own carbon and hydrogen.

TO BORE a hole in a strip or sheet of thin glass the following method is said to be successful: Place a cake of wet clay upon the glass, and then make a hole through the clay of the desired size, laying bare the glass at the bottom of the hole. Then pour melted lead through the hole, and it will drop through the glass, making a round aperture. The explanation is that the sudden application of heat cracks the glass in a circle corresponding in size with the hole in the clay.

A CURIOUS application of the Roentgen rays has been made by two noted British scientists. They took true and false diamonds for the experiment, and obtained entirely different results. When the rays were applied to the false diamonds only indistinct images appeared on the photographic plates. The real diamonds, however, allowed the rays to pass, and, as a result, much darker pictures were produced on the plates. Thus a certain method of discovering the quality of diamonds is assured.

A CHEAP and sure remedy for hard or soft corns is said to be turpentine. One who has tried it says if a little of this is rubbed on a corn every evening for about two weeks the corn and roots will both come entirely out and will not re-appear in any form.

ONLY seventy years have elapsed since the first railway in the world was finished. During that comparatively brief period 400,000 miles have been constructed.

AT Cape May, N. J., last week a speed of over ninety-four miles an hour was reached at the trial of the Holman friction-geared locomotive drawing a train over the South Jersey Railroad.

How He Ships His Bullion.

"Bet your life I won't do as W. A. Nevills does when my mine pans out as rich as the Rawhide property," remarked a young Stocktonian to-day, who has recently become interested in mining.

"How is that?" asked a *Mail* reporter, to whom the remark was made.

"Why," said the speaker, "Nevills does not trust his bullion to Wells, Fargo & Co., but brings it to this city in a buggy, and from here takes it to San Francisco. Several weeks ago he brought $137,000 in bullion to this city, and while here called at Hammond & Yardley's store. The bullion represented a three weeks' product of the mine, which is one of the richest in the country. Later he brought $92,000 worth of bullion to the city, and hence to San Francisco by boat. Of course, Nevills is accompanied on these trips by a shotgun messenger."—Stockton, Cal., Mail.

Recently Declared Mining Dividends.

Bullion-Beck M. Co., Utah, $15,000, payable to-day—a total of $2,075,000.

Le Roi, Rossland, British Columbia, $25,000, payable to-day (15th), making $200,000 to date.

Butte & Montana, Montana, $450,000, payable on the 17th inst.

Gold Coin, Colorado, $20,000, paid on the 10th inst.

Mammoth, Utah, $20,000, paid on the 1st inst.

Quincy, Mich., $300,000, payable on the 17th inst.

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

SISKIYOU COUNTY—Continued.

NAME OF MINE.	Character of Mine.....	No. of Men Employed.	Location.	Name of Superintendent or Agent.	Address.
Schroeder's Mine	Gold.	8	9 m W of Yreka	H. Schroeder	Yreka
Sterling (f'ly Crooker)	"	3	4 m NW of Deadwood	Will Crooker	Fort Jones
Steamboat	"	.....	4 m W of Fort Jones	Geo. Smith	Fort Jones
Sterling	"	.....	9 m W of Coles	J. Sterling	.....
Salmon River	Hyd'l'c	35	5 m NE of Sawyers Bar	Wm. Harrington	Sawyers Bar
Smith & Merriam	Gold quartz.	2	4½ m SE of Sawyers Bar	J. J. Smith and H. H. Merriam.	.....
Santana Bros	Placer.	5	3¼ m N of Hawkinsville	Santana Bros	Hawkinsville
Schroeder	Gold.	8	14 m SW of Yreka	H. Schroeder	Yreka
Steamboat	"	.....	4 m N of Fort Jones	N. Bennett and A C. Brockaw	Fort Jones
Sulphur Springs	"	1	Near Gottville	T. B. Southwark	Gottville
Siskiyou	"	.....	7 m NW of Yreka	T. Horr, Owner	Yreka
Spencer (form'ly Good Enough)	"	.....	12 m NW of Yreka	Bank at Yreka	Yreka
Sightman Claim	"	2	Cecilville	Geo. H. Sightman	Cecilville
Shasta	"	6	10 m E of Cecilville	W. Walters & Co, Own	Callahans
Summerville	Hyd'l'c	8	Summerville	Spooner, Smith & Campbell.	Etna
Short	Gold quartz.	2	10 m E of Cecilville	W. F. Short	Callahans
Sauer Kraut	"	6	5 m NW of Forks Salmon	Geo. McNeal, Own	Forks of Salmon
Shumway	Hyd'l'c	2	Forks of Salmon	Shumway Bros., Own	Forks of Salmon
Sargent Claim	Gold quartz.	.....	4½ m E of Callahans	Geo. Sargent, Own	Callahans
Specimen	"	2	5 m W of Callahans	S. S. Barr et al, Own	Callahans
Salmon	"	5	1 m W of Callahans	W. J. Salmon, Own	Callahans
Schuler	"	2	5½ m SW of Callahans	J. M. Schuler, Own	Callahans
Sugar Hill	"	2	5 m SW of Callahans	Geo. W. Smith, Own	Callahans
Scott River M. Co	"	24	2½ m SW of Callahans	F. P. King, Mgr	Callahans
Squaw Gulch	"	2	4 m NW of Callahans	Jean Boulangeot, Own	Callahans
San Jose M. & Mining Ditch Co	.....	.....	1 m W of Scotts Bar	San Jose M. & Mining Ditch Co.	.....
Skunk Hill	.....	.....	2 m S of Scotts Bar	Abandoned	.....
Schuler's Claim	Gold.	2	At Scotts Bar	Martin Schular, Own	Scotts Bar
Sherman Claim	"	2	10 m NW of Scotts Bar	W. B. Marquan, Own	Oak Bar
Sirley Claim	"	2	3 m E of Walker	S. H. Sirley, Own	Walker
Siskiyou Q. S. Co	Quicksilver.	5	16 m NE of Oak Bar	J. C. McCully, Own	Oak Bar
Shiner Claim	Gold.	3	9 m E of Happy Camp	John Shiner, Own	Happy Camp
Sweringen	"	2	10 m N of Happy Camp	B. Sweringen, Own	Happy Camp
Shore Claim	"	2	3½ m N of Happy Camp	G Shore, Own	Happy Camp
Siskiyou (Ock)	"	12	Happy Camp	Siskiyou M. Co., Own	Happy Camp
Smith's Claim	"	2	5 m E of Happy Valley	L. P. Smith	Happy Camp
Siskiyou M. Co	"	64	14 m W of Happy Camp	F. D. Fraser	Fort Jones
Stenshaw	"	2	16 m W of Cottage Grove	Sam Henshaw	Cottage Grove
Tiger	"	2	Quartz Valley	C. A. Sargent	Fort Jones
Taylor's Claim	"	3	4½ m NE of Sawyers Bar	H. P. Taylor M. Co	.....
Tillman Claim	"	2	3½ m E of Sawyers Bar	Frank Tillman	Sawyers Bar
Tim Cardoza Mine	"	5	Long Gulch	Tim Cardoza	Long Gulch
Tom Rogers	Placer.	8	Near Hawkinsville	Phillips Bros et al, O'n	Hawkinsville
Tiger Fork	Gold.	3	5 m NW of Callahans	Geo. Fader, Own	Callahans
Taylor & Co	"	2	Hamburg Bar	E. R. Taylor et al, Own	Hamburg Bar
Thompson	"	.....	10 m E of Happy Camp	John C. Wood, Own	Seiad
Tea Bar	"	10	9 m W of Cottage Grove	Hay M. Co., (Chinese) Own.	Cottage Grove
Ten Eyck	"	7	25 m W of Cottage Grove	Wm. Lord, Own	Orleans Bar
Uncle Sam	"	4	7 m S of Sawyers Bar	E. Scheffield	Sawyers Bar
Uncle Sam	"	2	Middle Fork Humbug C'k	J. N. Coulson and A. E. Thrash.	Yreka
Volcano	"	2	Quartz Valley	C. A. Sargent	Fort Jones
Varga's Claim	"	2	3 m S of Sawyers Bar	Frank Varga	Sawyers Bar
Wright & Fletcher	"	10	Oro Fino	Wright & Fletcher, O'n Hank Wright, Supt.	Fort Jones
Wright & Fletcher Ditch	Water.	.....	Near Oro Fino	Wright & Fletcher, O'n Hank Wright, Supt.	Fort Jones
Wilson Claim	Gold quartz.	3	10 m N of Fort Jones	L. F. Wilson	Fort Jones
Wilkes Claim	"	3	9 m NE of Sawyers Bar	Wilkes Bros	Sawyers Bar
Whistle Bear	"	4	Sawyers Bar	Barry, James & Blake	Sawyers Bar
White Elephant	"	.....	Sawyers Bar	Smith & Everleth	Sawyers Bar
Wm. Walker	Placer.	1	Cayuse Gulch	Wm. Walker	Yreka
William & Wademan	Gold quartz.	6	3½ m W of Yreka	William & Wademan	Yreka
Willlams Claim	"	2	6 m NW of Forks Salmon	Louis Williams	Forks of Salmon
Wilkinson's Claim	Placer.	4	3 m E of Forks Salmon	Wilkins, Campbell & Co.	Forks of Salmon
Willheim	Gold quartz.	2	5 m W of Callahans	W. A. Willheim, Own	Callahans
Walker Claim	"	5	6 m E of Callahans	Walker Bros., Own	Callahans
Windsor	"	2	5¾ m SW of Callahans	Dan Windsor et al, O'n	Callahans
Willard & Hickman	"	3	½ m W of Hamburg Bar	Willard & Hickman, Own.	Hamburg Bar
Williams Claim	"	2	13 m NW of Oak Bar	S. H. Williams, Own	Oak Bar
White Claim	"	2	3½ m E of Walker	Harry Wright, Own	Walker
Wells Claim	"	2	16 m W of Oak Bar	A. Wells, Own	Oak Bar
Wood & Fehley	"	4	2 m N of Seiad	Wood & Fehley, Own	Seiad
Wood's Claim	"	2	6 m W of Seiad	W. H. Wood, Own	Seiad
Wood, Geo. Bar	"	.....	5 m E of Happy Camp	Jas. Camp, Own	Happy Camp
Wingate Hill	"	9	9 m W of Happy Camp	Horace Gasquet, Own	Happy Camp
Yellow Jacket	Gold.	1	7 m S of Walker	Otto Hipler et al, O'n	Walker

SOLANO COUNTY.

Allen Well	Nat'al gas.	.....	7 m E of Suisun	Mike Allen, Owner	Suisun
Benicia Rock Crushing Co	.....	16	1 m N of Goodyear Stat'n	J. H. Hoyt, Supt	Benicia
Dickey Quarry	Lime stone.	9	4 m NE of Suisun	A. A. Dickey, Own	Suisun
Hilburn Well	Gas.	.....	4 m SE of Suisun	E. P. Hilburn, Own	Suisun
Hurley Well	"	.....	6½ m W of Suisun	Jas. Keyes, Supt	Suisun
McNaughton Quarry	.....	.....	1¼ m NE of Cordelia	A. A. McNaughton, Supt.	Cordelia
McKenzie & Reed	Pot'ery	6	Benicia	S. McKenzie and M. Reed, Own.	Benicia
Siebe Quarry	.....	.....	.....	P. Siebe, Own	Cordelia
Tolenas Springs	.....	1	5 m N of Suisun	W. H. Chittenden, Supt	Suisun
Thomason Quarry	.....	35	1 m E of Cordelia	J. L. Fry, Supt	Cordelia
Union Pressed Brick Co	.....	1	At Vallejo	J. Mathews, Supt	Vallejo
Vallejo Springs	Sulph'r	1	4 m NE of Vallejo	M. Madrid, Supt	Vallejo
Vallejo Pressed Brick Co	.....	1	1 m N of Vallejo	California Bank, Own	S. F.

TRINITY COUNTY.

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Armstrong	"	.....	½ m NW of New Riv. City	Miller & Son, Own	Denny P. O.
Anderson	"	2	10½ m S of China Flat	Chas. Anderson, Own	Burnt Ranch
Ah Lin	"	2	2 m S of Frances	Ah Lin, Own	Frances
Antone	"	2	3 m S of Frances	Isaac Antone, Own	Frances
Black Crow	"	2	Douglass City	J. Bowie, Own	Weaverville
Burges Claim	"	3	5 m S of Dedrick	Burges Estate, Own	Junction City
Bucks Ranch Mine	"	2	3 m E of Dedrick	Mason Thayer & Co., Own.	Douglass City
Bailey G. Mine	"	2	4 m S of Dedrick	.....	.....
Bonanza	"	1	¾ m W of Minersville	F. G. Tourtelotte, Own	Minersville
Bates & Tourtelotte	"	.....	3 m N of Minersville	Bates & Tourtelotte, Own.	Minersville
Blakemore	Placer.	...	5 m NE of Lewiston	Mrs. Blakemore	Minersville
Brown Bear	Gold.	30	At Deadwood	Mrs. H. Martin et al; C. Dobler, Supt.	Deadwood
Bates Claim	"	10	3 m SW of Lewiston	Chinese	.....

*Begun in issue of April 25, '96. (To Be Continued.)

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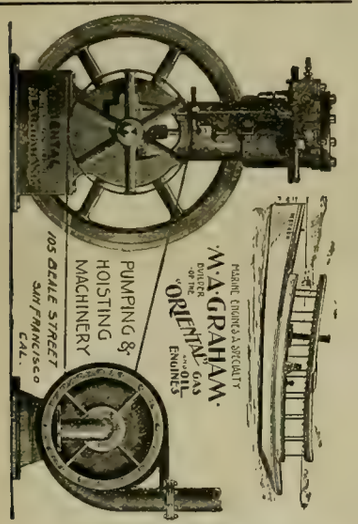
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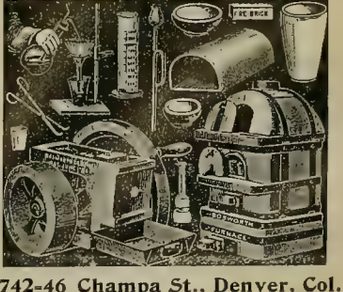

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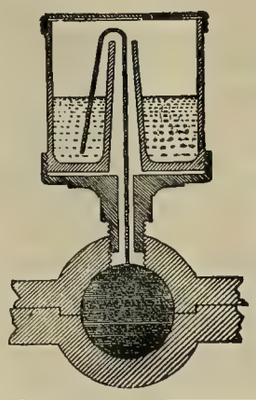
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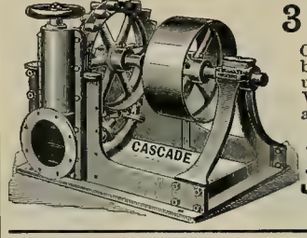

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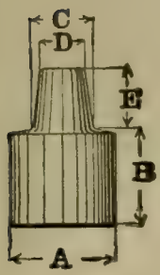

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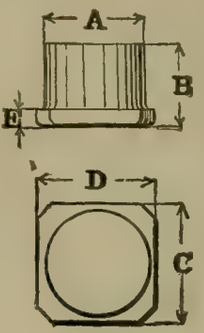

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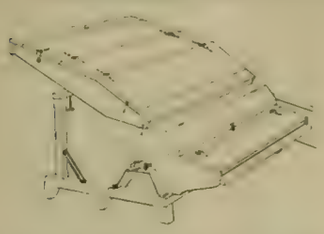

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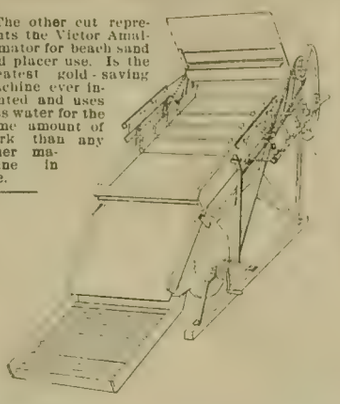

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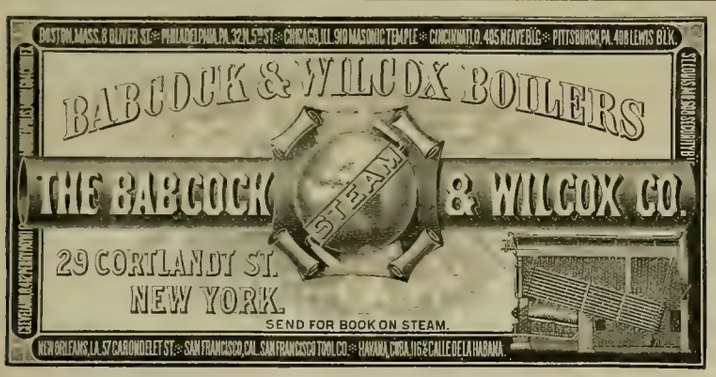
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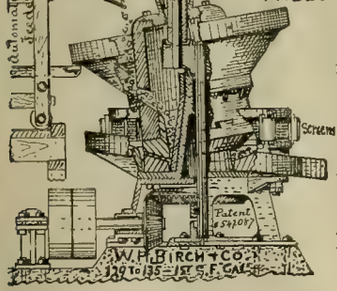

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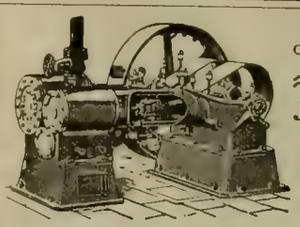
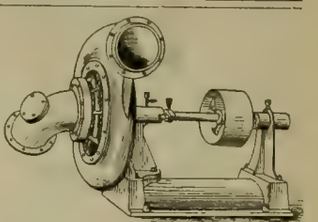


WRITE FOR CATALOGUE NO. 15.

Jackson's GAS —AND— OIL ENGINES.



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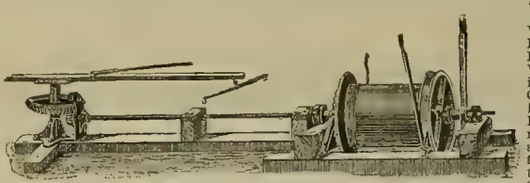

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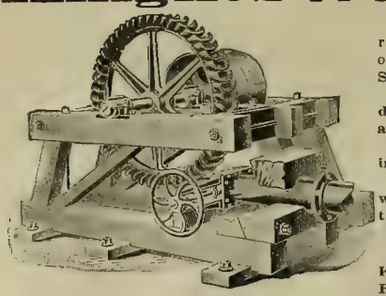

The accompanying cut shows the general arrangement of Knight's Standard Water Wheel, of which there are hundreds in use in different States of the Union.

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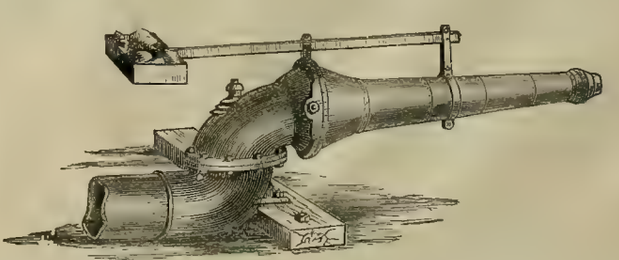

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Mining Summary.

CALIFORNIA.

Amador.

Ledger: The shaft at the Gwin has reached a depth of 1335 feet and sinking has been temporarily suspended while stations are being cut at the 1300 and 1200 levels. As soon as the stations are in far enough to make it safe to work in the sump, sinking will be resumed. Grading for the 40-stamp mill is about completed and the contract for its construction will be awarded this week. Work on the mill will be pushed as rapidly as possible after the contract is awarded, and milling will be commenced before the rainy season sets in.

The Esperanza, formerly the Boston, on which work was inaugurated by Col. Robinson, is now owned by a company of Boston capitalists, who are operating the property in a business-like manner. Ten stamps have been added to their 20-stamp mill and this week 30 stamps will be dropping. They have a large body of low-grade ore which, with enough stamps, will make it a dividend-paying property. They have a large chlorination plant at the property.

Dispatch: At Amador Queen No. 2 five of the twenty stamps were at work in the Morgan mine, in Hunt's gulch, last Tuesday, on rock taken out of this mine. There is also a new process to save the light "shine" that escapes the concentrators; this is a smooth floor covered with cloth canvas to catch this article, which escapes any and all concentrators at the mills. Thirty men are now on the payroll, and other men will soon be needed, when five or ten more of the stamps will be started crushing rock.

The Butte Basin tunnel is now 250 feet in length. The workmen in driving the tunnel have encountered a great deal of water. At one time 100 inches burst in upon them, and 50 inches is the least water they have at any time. They are now in softer ground, and will have to use timbers in their work as they progress.

Republican, August 8th: Last Tuesday five of the twenty stamps in the mill at the Amador Queen were started on rock from the mine, and it is expected that five or ten more stamps will soon be dropping.

The Belden mine, about two miles above Volcano, closed all operations on Saturday because the machinery was not of sufficient capacity for the work.

At the Reward mine, near Pine Grove, which has just changed hands, ten more stamps are to be added immediately.

Butte.

On the Magalia ridge near Nimshew, at the Puyderinktum, G. C. Higgins superintendent, the tunnel is 800 feet in pay gravel.

Work on the Oro Fino has been suspended, owing to bad air during the hot weather. The main tunnel is in 2800 feet; the branch tunnel 1000 feet. On reaching 2000 feet in the main tunnel the air gets so bad that the lights go out. When the mine closed, good pay gravel was being taken out from the channel. The manner of working the mine is peculiar. Up in the canyon is a reservoir and from this a ditch leads to a bulkhead. From this a pipe extends down the hill and into the tunnel, which is carried up to the face. The gravel is thus washed in the tunnel and a small flume carries off the water and debris.

At the Matherson quartz mine, D. H. Matherson owner and superintendent, the rock is broken up with sledges and is said to pay $50 per day for the men employed.

At the Forks of Butte the John Dix mine tunnel is now in 1000 feet; R. Diller superintendent.

The Magalia or Pershbaker mine employs thirty-five men. The shaft is down 500 feet and connected by a tunnel with the old works. J. T. Morkel is superintendent.

The Wilson mine is sold to an English syndicate; the machinery used at the Golden Butterfly has been hauled there.

The Ramona quartz mine is owned by Supervisors Morgenstern, Hughes and Benjamin and Charles H. Ford of San Francisco; the latter superintendent; lies one and one-half miles southeast of Magalia. A new tunnel 62 feet long has been run on the mine and a mill will be erected this fall to crush the ore.

At the Golden Summit, Chas. G. Kane is superintendent. Twenty men are employed.

Mercury: Mr. Geo. H. Evans, manager of the English Syndicate mines, is doing rapid work.

The old flume over the Morris Ravine that had been standing over sixteen years recently collapsed. The flume was 1250 feet long and 104 feet high at the highest point. It has been replaced by 34 and 36 inch steel pipe.

The pumps have started in the Golden Feather limited, lifting water into the canal, and making a lift of 25 feet more than last season.

They have begun sluicing the gravel in this claim. Two new steel derricks are in operation, capable of lifting boulders of four tons weight with a hoisting speed of 100 feet per minute on a single line; and with three lines, boulders weighing ten tons are easily handled with a hoisting speed of 40 feet per minute.

In speaking of the Banner, Mr. G. H. Evans says: "Have found the vein on the 1000-foot level; vein is fully 9 feet wide. Have discovered a new shoot of ore in the 700-foot level assaying $1737.70 per ton."

Register: J. H. Thomas, of La Porte, is pushing developments at the Bald Mountain mine rapidly. The tunnel has been driven under this mountain for the past nine years and is in 6800 feet. After Mr. Thomas got possession of the mine, he started to crosscut at 3800 feet, and, after running 800 feet, struck the channel. He raised 142 feet, and is now making another upraise of 50 or 60 feet; 12 men are working on eight-hour shifts, and it is believed the mine, when opened, will be very rich.

The Cherokee Mining Company is putting in a new head dam on main Butte creek, about eight miles northwest of Powelton. The dam will be 100 feet long and 40 feet high. About 40 men are employed under Luther Wakeham, who is superintending the work.

At Forbestown a heavy flow of water is reported in the Goldbank tunnel, which is considered an excellent indication that the ledge is not far off.

El Dorado.

(Special Correspondence).—The new mill and tramway on the Starlight are ready for operation. The machinery will be in motion when these lines are in print. There are about 700 feet of underground work completed and about 14,000 tons of ore ready for milling. There are ten stamps. The property is seven miles southwest of Placerville.

Work has been begun cleaning the old tunnels on the Champion and Chaparrel, in the Kelsey district, eight miles north of here. These are old properties of good record. They are now owned by Miss M. A. Kelly, who, in addition to being one of El Dorado's brightest teachers, is rapidly taking a place as an expert in the mining field.

The Big Sandy is running a drift on the 235, pending some improvements in the machinery lately placed in the hoist.

Work is progressing favorably in reopening the old Union, one mile east of town. This is the property of S. H. Maginness.

The Lone Star, four miles southeast of here, is showing up splendidly. The tunnel is in 180 feet, from which they are sinking on a 6-foot ledge of very fair ore.

Channel mining is receiving attention to a marked degree in the eastern and northern parts of the county, and is proving a successful enterprise, despite the obstacles met with.

The erection here of a cyanide plant, combined with an assay office and a 2-stamp test mill, is contemplated by an enterprising San Francisco party. It will prove a paying investment. The amount of work in these branches sent out of here is surprisingly large.

Upon the advent of cooler weather, the town is again being visited quite numerously by mining capitalists and experts in search of properties.

A development company, with a reasonable amount of capital, would find this an exceptionally good field for operations. Good prospects can be had upon favorable leases, long-time bonds and comparatively low prices. The properties are here, but capital is lacking to develop them.

G. W. J. Mitchell has been placed in charge of D. H. Jackson's Lone Star property.

Clyde Jackson, until recently assistant superintendent of the Larkin mine, has gone to take a year's course at Berkeley.

Geo. M. Clark, having completed a course at Berkeley, after some years of practical mining under his father's tutelage, has been placed in charge of opening a large gravel property here.

Placerville, Cal., Aug. 12, '96.

Kern.

The Mammoth, Little Mammoth and Tom Lane mines are reported purchased by the Los Angeles Gold Mining Company, who will put up a 10-stamp mill to be worked by water power from the Kern river, and a tramway to carry the ore from the mine to the mill.

Nevada.

Transcript: By the purchase of the Spanish mine, the Champion Company still further extends its possessions and field of operations. The company are now employing over 200 men at their mines and works on Deer creek and have 70 stamps pounding away day and night on good ore. With the 10 stamps at the Spanish running, they will have twice the milling capacity of any mine in the district.

San Bernardino.

A 20,000-pound boiler, 300 H. P., has been ordered for the Banner mine.

A 10-stamp mill is being erected for the Green Lead mine in Holcomb valley.

San Diego.

A deed was filed in San Diego last week by which D. K. Allen transfers to G. W. Ireland, for $30,000, the Golden Dream and fourteen other mines in Old Picach district, on the Colorado river.

The Escondido Gold Mining Co. has resumed work with a full force of men.

W. W. Stewart, receiver for the Golden Cross mining property at Hedges, has filed an inventory of all personal property belonging to the company and taken possession of by him as receiver. The property consists of groceries worth $3098.06, dry goods $1870.40, boots and shoes $1944.35, notions $276.77, drugs $262.07, grocery and glassware $172.85, hardware $562.60, mechanical supplies $3547.05, wood $4500, 13 mules, 5 horses, 5 wagons. He has been directed by the court to report the quantity of ore taken from each mine and the amount milled each day, the amount of bullion shipped for each cleanup, and other matters pertaining to the receivership.

Shasta.

The Minnesota mine, Spring creek, near Copley, is about to resume operations; J. W. Parmelee manager and superintendent.

Siskiyou.

(Special Correspondence). — The Siskiyou hydraulic gold mines, the property of F. Beaudry of Weaverville, are located on the south fork of Scott river, about 40 miles southwest of Yreka and 25 miles from Gazelle station, and consist of 1000 acres prospected through shafts from 4 to 25 feet in depth, showing that the gravel runs from 30 cents to $1 per cubic yard. There are four monitors on the ground and 4500 feet of pipe, and extensive preparation is being made to work this claim on a large scale. A ditch to convey 3000 inches of water, now under way, will be completed by Sept. 1st. But five men are employed at the mine at this writing, it being temporarily idle during the erection of a sawmill.

The Beaudry hydraulic gold mine, owned and managed by F. Beaudry, is located just opposite the above-named hydraulic plant, on the south side of the river. It consists of 1600 acres of patented ground. The prospecting has proved satisfactory to its projector. On this mine are three sets of derricks with cables run by water power, a sawmill, miles of ditches and hydraulic pipe, an electric plant, and twenty buildings. The principal ditch leading to this mine is three miles long; the water is taken from Jackson creek, one of the main branches of Scott river. It furnishes the mine with 2500 inches of water nearly the whole year round. A telephone is now being put up to connect this mine with Callahans Ranch P. O. Ten men are working with two monitors. L. P. Mc.

Trinity.

(Special Correspondence).—The Brown Bear mine, at Deadwood, twenty miles south of Weaverville, Chas. Dobler superintendent, covers an area of over one mile square, and consists of a number of ledges and a 15-stamp mill with four concentrators run by steam power. It is pierced by six tunnels, one of which extends entirely through the mountain and is over a mile in length, the others vary in length from 2,200 to 3,000 feet, through which the present development is being carried on. Forty men are employed in mine and mill. Thirty tons of ore daily pay from $5 to $10. A portion of the mine is worked by leasers. The ore so mined is said to pay from $30 to $75 per ton, carrying 2% sulphurets.

The Baily group of mines, consisting of the consolidation of fifteen different claims, owned and managed by C. W. Smith, is on Canyon creek, twenty miles north of Weaverville. There are four tunnels, one above the other. The top one is in 200 feet, the second 100 feet, the third 75 feet and the fourth 75 feet. About 100 feet of stoping has been done in the two lower tunnels. A mill test of 500 tons averaged $28. The sulphurets, which are of a high grade and constitute about 2 per cent of the output, have not been saved in the past. They run $512.64 in gold and $34.63 in silver. Two concentrators are now being put in.

Dedrick & Smith quartz mines, owned by C. W. Smith and others, is on Rattlesnake creek, thirty-five miles west of Weaverville; six locations; ledge pierced by a tunnel in 50 feet, that taps the ore body about 50 feet from the surface. Assays from this group of mines show $20 gold and 21 ounces silver. This is known as Rattlesnake district, an entirely new camp, and twenty-five miles from a wagon road. Several claims were staked out this season.

De la Cie Fse Des Placers Hydrauliques de Junction City (The French Company of Placers Hydraulics of Junction City), a corporation; capital stock 2,000,000 francs ($400,000); principal office Paris, France; E. Cumenge president; F. Beaudry resident director; E. Saladin, managing director and superintendent—has property consisting of 1600 acres, 560 of which have been patented, one mile west of Junction city, (extending up to the town site) and twelve miles west of Weaverville. It consists of a series of benches of an ancient channel in and near the Trinity river, of more than ordinary richness and runs from a few feet to 250 feet in gravel. They are working this mine by a very extensive and systematic hydraulic process. The source of their water supply is in Canyon creek, nine miles north of the mine, conveyed by ditches, flumes, etc., with a constant supply of 3,000 inches of water, which they are just now engaged in increasing to 6,000 miner's inches. There are also five bedrock ditches on this property aggregating over a mile in length. They have a dozen large monitors, seven of which are in position, and from two to four in constant use day and night with 8-inch nozzles using 1500 inches of water under an effective pressure of over 200 feet. About 7000 feet of pipe running from 34 down to 15 inches, conveys the water from the ditches and reservoirs to the monitors. A tunnel 200 feet in length (previously 400 feet long, but reduced by floods) directs the debris by a short route to the river from the mine. They have three sets of derricks, with tramway cables run by water power, for clearing the mine of the larger boulders. The whole property is lit by incandescent lamps and arc lights, from their electric plant. Their mining season for washing is about eight months, during which time they employ 35 or 40 men, and remove about 1,200,000 cubic yards of gravel. A portion of this mine is worked the year round. The output, which is a delicate question to ask any mine manager about, from this mine is said to thoroughly satisfy the stockholders, at least the property in not for sale.

The Haas placer mine, owned and managed by F. G. Haas, is one mile east of Junction City and consists of several ancient river beds or channels, near the Trinity river and next above and south of the French mine above mentioned. It contains 240 acres in area, 160 of which are patented, the pay gravel of which is from 2 to 50 feet in depth. The water supply for this mine is taken from Clear creek and brought by a ditch 3½ miles long. It supplies 1000 miner's inches of water for about six months of the year. Some cement has to be blasted, but it is trifling compared with the cubic yards of gravel handled in this mine. The bedrock, where exposed, is slate and porphyry. Mr. H. has two monitors in position, and one in constant use. A partial cleanup is made once a month and completely once a season, about six months. Six men are employed, and with this force, during a run of five months in 1891, Mr. H. took out $29,000. He says this season will equal 1891.

The La Grange Mining Company—a corporation; capital stock, $5,000,000; principal office at Denver, Colo.; E. Saladin, general manager; Wm. Ratford, superintendent,—has a property which begins three miles nearly west of Weaverville and extends one and a half miles farther west, to within five miles of Junction City, where the principal work of this corporation is now going on. The property of this company, purchased from the Trinity Gold Mining Co. about three years ago, consists of 400 acres of patented mining ground and is out of the usual line of gravel deposits, being a mountain of gravel. They are now piping against a bank 300 feet high, with over a mile of similar ground back of it, facing them at an angle of 40° up the mountain, and all in pay. Their water right, as a whole, is among the largest in the State. It consists of the "West Weaver," "Rush Creek" and "Stuarts Fork" water rights, the farthest source of which is in Stuarts Fork, a distance of thirty miles. This furnishes them with from 3000 to 4000 miner's inches of water the year round. They are at present engaged in constructing a flume, with some ditch, eleven miles long from Stuarts Fork, a branch of the Trinity river, to a point on that stream, where they cross the same with the aid of about one mile of pipe, at which place they are piercing the mountain with a tunnel that will be 8400 feet long when completed; they are now in a little over 2000 feet. This tunnel will save them about eleven miles of ditch, flume and pipe. From this point their water will be brought by ditch, tunnel, flume and pipe to Rush creek, and from this point about fourteen miles more of ditch, flume, two pipes and another tunnel to reach the mine—in all, about twenty-eight miles of costly watercourse. They have three large monitors; also two derricks that have a capacity to lift from three to four tons each, and two cables or tramways to transport the larger boulders out of the mine; also a 6-foot flume, with undercurrents, about 500 feet in length. They are working about fifty men. This company expended for construction work alone during last year nearly $100,000, without an assessment.

The Weaverville Creek Mining Co., previously a corporation, now personally owned by H. Junkans of Weaverville, adjoins the townsite of Weaverville on the south, in the bed of Weaver creek; it consists of 260 acres of patented ground. At present only the banks of the stream are worked, owing to the quantity of water in the creek and slight fall in the grade. Mr. J. is working eleven men with one giant and is satisfied with the output. A tunnel is anticipated for this mine, that by running through an arm of the mountain one and a quarter miles 75 feet fall can be obtained and five miles of the bed of the creek exposed, which is probably the richest in this end of the State. The estimated cost of this tunnel is $100,000

The McMurray & Hupp placer mine, owned and managed by those men, is half a mile east of Weaverville and consists of an ancient channel of about 200 acres of patented ground. They have three giants in position, working one at a time, using 3500 inches of water, 500 of which is run through the pipe and 3000 over the bank. In early days this mine was run as a drift claim and is said to have paid well. They have their own water ditch, four miles long, the source of the supply of which is in East Weaver creek. They have on the mine about 4000 feet of 13-inch and 15-inch pipe and about one mile of 4-foot flume with 2¼ inches fall to 12 feet. They employ from ten to fourteen men, run from six to seven months, and clean up once a year.

The Minersville Hydraulic Mining Co., a corporation, capital stock $1,200,000; principal office at Weaverville; property twenty miles north of east of Weaverville; Count de Kergorlay of Paris president; F. Beaudry resident director and vice-president; and E. Saladin general manager; contains over two sections of patented mining ground, situated on the principal ancient channel of this county. For depth of gravel and completeness of outfit this mine is considered second to none in the State. Their water right consists of 6000 inches of water taken from the east fork of Stuarts fork of the Trinity river, seven miles north of the mine, conveyed hither by ditches and flumes. By the aid of reservoirs they are able to mine the whole year round. This mine is equipped with six large monitors, two of which have an 18-inch inlet. They have an electric plant, telephone, two derricks with cables and four more derricks on the grounds ready to put in.

The North Star quartz mine, owned and managed by James Mabury, is one and one-half miles southwest of Coleridge, twenty-five miles northwest of Weaverville, and consists of a group of six claims, with five different ledges, all of which run nearly north and south and dip west between walls of granite. They have been pierced by tunnels, varying in length from a few feet to 360 feet. The ore bodies run from 12 inches to 3 feet in thickness. The Little Chief, one of the claims of this group, has had considerable work done upon it, stoping in each direction on the vein. This mine is equipped with a 10-stamp mill and three concentrators run by water power. The mine and mill furnish employment for fifteen men the year round. With this force twenty tons of ore are mined and crushed every twenty-four hours. The rock is free milling, and averages $11 per ton, carrying from 2% to 3% of sulphurets.

The Strode quartz mine, owned by Strode Bros., J. Strode superintendent, is one and one-half miles from Carrville, five and one-half miles from Trinity Center. It consists of four claims. The hanging walls are porphyry, the footwalls are diorite. The ledges run from 10 inches to 4 feet thick. This group of mines is being developed by five tunnels—one above the other—varying from 40 to 600 feet in length. They have a 5-stamp mill with one concentrator, run by water power. They own, in connection with this mine, the Old Snow Gulch Ditch, two and one-half miles long, that was built in the early fifties. The ore is free milling, carrying about 2% sulphurets. They employ twelve men and mine and mill seven and one-half tons of rock every

twenty-four hours. This is also a bullion-producing mine, but information regarding it is scarce.

The Ruby Queen mine, owned by R. McLeod & Co., two miles northeast of Carrville, five miles north of Trinity Center, consists of four claims, or 6600 feet in length, free-milling quartz averaging $5 per ton.

The Buckeye group of placer mines, D. F. Weed, superintendent, is on Buckeye creek, two and a half miles north of Trinity Center, and consists of ten claims aggregating 200 acres in area. This property has been prospected by a shaft 40 feet deep sunk to bedrock. It averages 13 cents to the cubic yard from top to bottom, and portions of it would pay to drift, but so much better to hydraulic that the mine is to be worked by that method. They have located a water right, and San Francisco parties are to begin active work upon this property with a full force of men. It is temporarily idle.

The Vollmers & Doty gold quartz mine, owned by themselves, six miles from Trinity Center, G. Doty, superintendent, is pierced by a tunnel in 92 feet, that taps the ledge at 120 feet from the surface, showing an ore body 8 feet thick. They have begun to drift each way on the ledge and have a fine prospect for a paying mine.

The Adelaide quartz mine, owned by Postlethwaite Brothers & Gillett, is on the north branch of Copper creek, four and a half miles from Trinity Center; Robt. Postlethwaite, superintendent. This property consists of two claims of 1500 feet in length each. The ore body runs east and west and pitches to the north; a serpentine hanging wall and a diorite footwall, with a 2½-foot ledge of high grade ore carrying some sulphurets and iron and running about $40 per ton in gold. A shaft is being sunk and a tunnel to be started to crosscut the ledge. They have their own water right and feel highly elated over their prospects.

The Forget Me Not mine, owned and managed by Geo. L. Carr, is south of the Strode mine, five and a half miles north of Trinity Center; ore a 12-inch ledge of high grade. It is being developed by two tunnels, one above the other. The upper one is in 200 feet and the lower one 300 feet, with an upraise of 100 feet in the latter. They run an arrastra, which has a capacity of one and a half tons a day. Steps are now being taken to erect a 5-stamp mill.

The Altoona Quicksilver Mining Co. is a corporation, with principal office in San Francisco. This property, that has been in litigation for about fifteen years, is reported to have reached a basis of final settlement, to be proclaimed in the near future. J. P. Stidger is the superintendent. This corporation's works and mine are located seventeen miles north of west of Castella and twenty-two miles north of east of Trinity Center. It consists of an irregular shaped body of mining land, 1200 feet by 1500 feet in area, covered by U. S. patent. Unlike most other mines of this character (cinnabar) it exists in regular ledge form. This ore body runs nearly north and south between walls of porphyry, and, unlike a quartz mine, it dips to the west, the country rock being serpentine. The "gangue" or ore body is a mixture of "blue porphyry," lime, spar and clay, 250 to 300 feet in length and irregular in width. The development consists of a shaft down 350 feet, with some 200 feet of crosscutting and stoping. Their improvements consist of a fine hoisting works, with pumping plant, run by steam; a roasting plant, condensers, and retort. The latter has a capacity of thirty tons every twenty-four hours. They usually work from sixty to seventy men; at present they are employing one hundred men. They are just now preparing to use water power and an air compressor. This mine has a permanent look and indicates a good paying property.

The Copper Queen, a copper mine, owned by G. O'Shea, F. Dimock and T. J. Baker, is on Copper creek, five miles east of north of Trinity Center. The ledge averages 40 feet in width and is said to contain 15 per cent copper, $4 gold and one ounce in silver per ton. David Hunt is superintendent. This company owns a water right, and a wagon road to the mine. A shaft has been sunk 75 feet and a crosscut tunnel run in 300 feet. Active development work has just been begun on this mine after a long season of inactivity.

The Headlight gold quartz mine, in Red Gulch, 3½ miles from Trinity Center, is owned by Baker & Dimock, and consists of two parallel claims of the usual 1500 feet in length, the ledges of which run east and west and dip north. A porphyry hanging wall and a slate footwall inclose one of the ore bodies of this company, 150 feet wide, the croppings of which look like a small mountain. A crosscut tunnel was started some time since and run in 75 feet, expecting to tap the ore body in 50 feet more, at a depth of 152 feet from the surface. The rock is low-grade, but they have an immense body of it. Active work will begin on this mine Sept. 1st.

The Hatchet Creek placer mine, owned and personally managed by A. P. Haskin, situated half a mile northwest of Trinity Center, consisting of 72½ acres, 54 of which is covered by U. S. patent, is an ancient channel cut down by the present living waters of Hatchet creek. It is mined by the hydraulic process. Mr. H. has his own water ditch, which is six miles long and has its source in Buckeye creek, furnishing him for seven or eight months of the year with 350 miner's inches of water. Connected with the mine is a bedrock flume, 1200 feet long and 700 feet wide, of 10 and 12-inch pipe. The gold taken out here is very coarse, running from the size of a wheat grain to pieces valued at $60. Cleanups occur during the month of August, and but once in a season. The present owner has worked this mine for the last fifteen years, and he says the output has always been satisfactory.

The Bloss & McClary placer mine, owned and managed by the two men for whom the mine is named, adjoins the town of Trinity Center on the northwest. It contains an area of 660 acres, including a portion of the town site, of the principal ancient channel that runs through this part of Trinity county. About one third is still unwashed, the pay gravel upon which runs from 6 to 40 feet in depth. Their water rights combined furnish them with 3000 miner's inches of water, viz: a ditch, seven miles long, that they own personally, furnishes them with 2000 inches, and a ditch, two miles long, in which they own a one-half interest, furnishes them with 1000 inches.

The Chinese hydraulic placer mine, located adjoining the Bloss & McClary mine on the south, is owned by the Quong Ah Quong Co., a corporation represented by eighteen shareholders. This company's property consists of 80 acres of mining ground, on the main ancient channel, and 60 acres of dumping ground, all covered by U. S. patent. They own a water right consisting of a ditch three miles in length furnishing 1000 inches of water, and 1½ miles of bedrock flume 5 feet wide, that empties into the Trinity river, also, 450 feet of 15-inch pipe; run one No. 4 "giant" and have a self "shooter," with a 4x6 foot outlet, with twenty minute pulsations. This company work eighteen men; their annual output of gold averages about $15,000 for seven to eight months' run. They are known to have taken out $24,000 in a single season, from 1½ acres of ground. The principal office of this company is at Weaverville, Ah Deen is general manager, Ah Gee is superintendent at Trinity Center.

The Ella May mine, owned and managed by John Larsen, a drift mine, located at the mouth of Hatchet creek, half a mile north of Trinity Center, and consisting of 40 acres of patented land, contains from 4 to 5 feet of gravel that pays to drift. It has paid from $12 to $60 to a set of timbers, 4x6 feet. It is worked through an incline shaft sunk to bedrock, 42 feet deep, equipped with a double cartrack, and run by an overshot water wheel. The mine has a drain tunnel 2200 feet long, and a small flume 300 feet in length extending to the river. This mine usually employs twelve men, is temporarily idle, but is soon to resume operations.

Coffee Creek Mining Co., a corporation, capital stock $500,000; principal office San Francisco; property located on Coffee creek, northwest of Trinity Center—the Reindeer, Gold Dollar and Blackwarrior locations, known as the Hill group of mines; E. A. Wagner, superintendent. High grade free milling quartz ledges run north and south and dip to the east. The walls of the Reindeer ledge are decomposed quartz and of the Blackwarrior porphyry. A shaft has been sunk on the former 30 feet, and a tunnel has been run in on the ledge 130 feet, which at this point is 18 inches thick. The Blackwarrior is being worked through an open cut, exposing a well defined ledge 4 feet thick. The ore runs from $50 to $67, carrying 2% of sulphurets. They own a ditch one mile long, have free water and timber; now working eleven men and expect to erect a 20-stamp mill this fall.

The Underground Treasure placer mine, the property of P. Holland and J. L. Coyle (P. Holland superintendent), in the east fork of Coffee creek, eighteen miles northwest of Trinity Center, consists of the consolidation of fourteen claims, extending in the bed of Coffee creek, up that stream, three and a half miles. It is probably the richest, certainly the most curious, formation for a placer mine in this country, and the method of working it a scientific study. This mine (which is the creek) contains apparently nothing but huge granite boulders and about 10,000 miner's inches of water; but it does contain some gravel, a little black sand, and much coarse gold. One piece weighing a little over 27 pounds of pure gold was taken from this mine on July 1st. The previous erroneous account of this find put it at 45 pounds. The pay ground in this claim is from 2 to 20 feet deep, including boulders. About a ton of giant powder is used during a season of six to seven months, to break up the rocks so that they can be washed down stream. It is worked in sections of about 300 feet at a time. A systematic dam is thrown across the creek and arranged as an "automatic shooter." The entire water of this creek is completely stopped for fifteen minutes at a time, backing the water so that they cover an area of about three acres. During this period a force of ten men work at drilling, blasting, etc.; but for the next five minutes they must escape to the banks of the stream to allow the shooter to empty, the opening of which in this mine is 12 by 16 feet, representing a front of 192 cubic feet of water. Boulders over 3 feet escape before this force like a football before an athlete. It would seem that gold and all would be washed out of reach, but not so; a perfect system of flume and undercurrents save it all. When bedrock is to be cleaned they throw a wing dam across the stream above that portion, and the object is accomplished.

L. P. Mc.

NEVADA.

NYE COUNTY.

In western Nye the Belvidere mine quartz mill is running.

Bell & Bray are building a 10-stamp mill in the vicinity of Ione. About seventy men are employed in that district.

Downey Bros. are developing gold mines in Sullivan district, with flattering prospects.

OREGON.

BAKER COUNTY.

The Frenchmen who bought the twenty-one placer claims on the Grande Ronde river paid $51,000. The Grande Ronde Placer Mining Co. is now in full and undisputed ownership and possession. T. H. Crawford of Union, who was the attorney for Paul Bozonni, received an equal share with his client, viz., $8000. E. L. Giroux, one of the promoters of the sale, got $8000. Woodley is the postoffice address of the new company.

At East Eagle the Eagle Creek G. M. Co., W. P. Keady manager, has a 10-stamp mill and three concentrators on $40 ore. The ore is conveyed from the mine to the mill by a pack train of fifty mules, two trips daily, ten tons each trip. The company intends soon to move the mill nearer the mine and add ten stamps.

WASHINGTON.

The Hydro Smelting & Refining Company has organized at Tacoma, capital stock $100,000, "to reduce iron and all precious minerals by a new patent process, for making iron direct from the ore, and smelting all precious minerals, no matter how rebellious the ore may be, without roasting or fluxing, for less than $1 per ton."

BRITISH COLUMBIA.

At Quesnelle Forks, Cariboo, the Horsefly hydraulic mine has completed fitting up pipe and hydraulic elevators. The question of water rights has arisen between the two Horsefly mines, each claiming to have the prior right to 2000 inches of water out of Mussel creek. This creek is now flowing at the rate of about 2500 inches, and of this amount the Horsefly hydraulic uses 1000 inches. There are as reservoirs three lakes - one four miles long, one eight and one nine miles, which, with proper dams, will hold back an abundance of water for both mines for the season. Each company thinks it the duty of the other to do this reservoiring; but as the Hobson mine has possession of the water, his company has the best of it. An injunction is asked restraining the Horsefly Hydraulic Company from taking out the water of the creek before it reaches his company's ditch head, which is about 500 yards below the head gate of the Horsefly hydraulic.

The Canadian Pacific M. & M. Co. will erect a concentrator near Ainsworth; contract price $10,000.

UTAH.

Salt Lake *Tribune*: Ajax has registered another strike. On the 200-foot level of the main shaft, which has been put from the tunnel level, and at a point 400 feet below the surface, ore has just been uncovered that yields as much as 2½ ounces gold per ton, in addition to 15 ounces silver and 6 per cent copper.

In Tintic nearly all the machinery of the new South Swansea hoist is in place and ready to run. The foundations of the buildings are completed, but it will take over a month to finish the hoisting works.

At a meeting of the board of directors of the Utah and Galena last week, the usual dividends were posted. The former will pay $2000, when the total will have advanced to $149,500, while the latter will distribute $3000, making a total of $46,000.

IDAHO.

Dividends have been paid by Cœur d'Alene mines as follows: Standard, $800,000; Poorman, $340,000; Helena and Frisco, $425,000; Bunker Hill and Sullivan, $150,000; Granite, $83,400; and Tiger, $180,000. The *Spokesman-Review* predicts that the mines of the district will this year produce from $7,000,000 to $8,000,000. It is said that if the owners of the Bunker Hill and Sullivan were to exert themselves, they could produce one-half of the lead product of the United States.

Avalanche: Silver City is quiet but prosperous. There are enough miners here to fill all demands, and but few idle men. More and better prospecting is being done this season than ever before. About 400 men are now on the pay-rolls of the various mining companies, making a monthly disbursement of about $36,000. Timber and wood contracts, freight and miscellaneous expenditures of the mining companies, will raise the amount to nearly double these figures.

WYOMING.

Two discoveries of mica of value have lately been made in Wyoming, says the Denver *Republican*. One of the properties is situated in the northeastern portion of Albany county, on the western slope of the Black Hills range, and the other in Carbon county, not far from the Battle Lake copper fields. Both properties are showing up well as the development work progresses, and it is reported that the mica will readily square 12 inches. The mica is perfectly transparent and free from iron stains.

MICHIGAN.

At Bessemer, Mich., the Tilden mine has closed down, completing the shutdown of the Rockefeller mines in that city. Nos. 6, 7, 8, 9 and 19 now employ just enough men to keep the mines clear of water. In a large number of mines the pumps have been taken out and the mines allowed to fill with water. The Gogebec range of mines are practically all shut down at Hurley, Ironwood, Bessemer and Wakefield. There are less than 1000 men at work on the range, where at one time there were over 8000 employed. The several mining companies have allowed their employes all unoccupied lands for farming, but army worms have destroyed the last hope of the miners of having at least vegetables for the coming winter.

NEW SOUTH WALES.

The annual report of the department of mines and mining, for 1895 gives the following table of the quantity and value of gold, silver, and copper produced prior to and during the year 1895:

	Quantity.	Value.
Gold mined prior to 1895	11,034,397.91 oz.	$196,851,163
Gold mined in 1895	360,165 45 oz.	6,316,459
Totals	11,394,563 36 oz.	$203,167,622
Silver, silver lead and ore exported prior to 1895	Ingots 6,676,591.02 oz.; Silver lead 344,380.77 tons.; Ore 600,893.10 tons	$ 91,685,472
Silver lead and ore exported in 1895	Ingots 550,142 oz.; Silver lead 39,687 tons.; Ore 190,192.95 tons.	$ 8,884,900
Totals		$ 100,570,372
Copper exported prior to 1895	Ingots 100,068 50 tons.; Ore & regulus 8,212.95 tons.	$ 31,355,450
Copper exported in 1895	Ingots 2,630 15 tons.; Ore & regulus 1,221 00 tons.	$ 665,390
Totals		$ 32,020,840

SOUTH DAKOTA.

Black Hills *Mining Review*: As development work progresses in the various mining localities new ideas in earth structures and mineralogical effects are continually suggesting themselves. For a long time prospectors and practical miners accepted the theory that within the siliceous ore belt the upper shale ore was the only object of value—that their chutes, if followed, would soon exhaust on their own level or change to a "vertical," but of late years, since prospecting on better informed lines has been presented and the work combined with thought, a decided modification of views has deposed a great many of the old ideas concerning the regularity and continuity of ore bodies, and instead of the "going down" or the "shooting up" process the continuity of the "ore floors" or "ore zones" of the blanket formation can be expected only when the surface, through igneous forces, exposes the same matter visible at the outcrop.

The Deadwood *Pioneer*, speaking of the Bald Mountain district, says: "The B. & M. ore train brings down to the Kildonan an average of 125 tons a day from the Welcome and the Hardscrabble, 35 from the Maggie and 15 from the Fannie—the smelter. The Elkhorn, Cyanide, Golden Reward and Big Bonanza bring to the smelter an average of 120 tons a day, 25 from the Clinton and 20 from the Portland. In addition to these regular shipments, both roads carry from 50 to 150 tons a day from mines that ship only once in two or three days.

The owners of the Pluma mine, adjoining the Hawkeye and Homestake, will reopen it shortly. Disagreements among the stockholders, which have been the cause of the suspension of work for several years, have been settled.

MONTANA.

The accumulation of tailings at the Iron Rod mill, Jefferson county, which has been accumulating for years, is to be worked at the rate of 75 tons per day.

COLORADO.

D. F. Burns, president of the Portland Mining Company, speaking of the prospective yield of Cripple Creek to a representative of the Denver *Republican*, said: "Unless the mine operators make up for lost time the aggregate output of Cripple Creek will be less this year than it was in 1895. There are different reasons for this, but lack of ore is not one of them. The Independence mine was held back on account of the new mill Mr. Stratton has put up on the ground. I was through it last Wednesday and everything is now in place with the exception of three pulleys which became lost or mislaid, and are being replaced. When these arrive the mill will be started up at once. Another setback for the total output came through the leasers. This year an unusually large number of leases expired, and as the mines were left in pretty bad shape, as a rule, it took the owners some time to clean them out. In spite of all these drawbacks, Cripple Creek may maintain last year's record or even beat it, if the mine owners or a few of the larger ones take a spurt in shipping."

The Independence mine, owned by W. S. Stratton, at Cripple Creek, has again been started up after a suspension of six weeks. The high-grade ore is being saved for shipment to the smelters and the low-grade ore is added to the already large dump, which is to be put through the new mill which will soon be put in operation.

There have been reported some strikes at Iris, twelve miles southeast from Gunnison, of large bodies of free-milling ore.

NEW MEXICO.

Silver City *Enterprise*: Forty-five men are employed at the Golden Giant mine and mill.

The Confidence mine is producing a regular quota of eighty tons of ore per day, which is reduced at the mill on the Whitewater.

ARIZONA.

Journal-Miner: In doing some development work on the Paragon claim in Hassayampa district, Robert J. Cartmell struck some black sulphide of silver which goes 91% in silver. The claim is located within a short distance of the celebrated Howard mine and is on a parallel ledge to it.

Nogales *Oasis*: M. Perrollaz, a gentleman who represents French capital, has recently closed a deal for the Cerro del Oro mine, in the Arizpe district, the purchase price, it is said, being 1,200,000 francs (about $240,000 gold). Late in the present month there will arrive, from France, M. Duchatnet, chief engineer, his assistant and the master mechanic to inaugurate the work of exploitation and erection of machinery. The mine is five days' journey from Nogales.

Arizona *Sentinel*: The New York company that purchased the Dr. Jayne group of mines at Picacho has had an estimate made of what it will cost to put the mines and mill into shape for crushing 125 tons of ore per day.

An English company has secured a group of twenty-one mines in the Picacho Basin, adjacent to the Goshen mine of the Dr. Jayne group, which they will open up when cool weather comes, and for the working of the ores of which they will put up a mill at the Colorado river.

Coast Industrial Notes.

—Sacramento, Cal., decided last Wednesday to issue $65,000 bonds for a new water system.

—Santa Clara, Cal., by order of court, is allowed to buy and operate a municipal electric light plant.

—A decrease is reported in the Los Angeles oil output, and an increase in that of Coalinga, Fresno Co.

—There are over 200 carts at work grading the new railroad between Sisson and the McCloud river.

—The stockholders in the Truckee ice palace are already making preparations for next winter's carnival.

—The Western beet-sugar factory, at Watsonville, started on a five-months' run last Wednesday, employing about 125 additional men.

—It is reported that F. Aug. Heinze, of Butte, has a party in the field making surveys for a railroad from Robson to Trail, in British Columbia.

—In addition to the usual number of halves, quarters and dimes, 750,000 standard silver dollars will be coined at the San Francisco mint this month.

—The S. F. & S. J. V. R. R. will decline to run through Fresno, Cal., unless the property owners of that city recede from their present demands for right of way.

—The Ocean Beach Oil Company has resumed operations at San Diego, Cal. They will put down two wells to a depth of 2000 feet. The first is down 1300 feet.

—The oil refinery built at Fresno by the Sunset Oil Co. is in operation. Its capacity is 1000 gallons per day. Tests show that the crude oil is 40 per cent kerosene.

—H. H. Morehouse is expected here shortly from Guatemala. He has a contract for a complete hydraulic and electric plant for the city of Antigua, to cost $70,000, and will buy it here.

—The steamship Monowai carried away last Wednesday for Australia 2200 tons of freight—the largest cargo she has taken. It consists of flour, canned goods, dried fruits, paper and machinery.

—Two Fresno men are going to put up a $10,000 mill there for seeding raisins. It will seed 40,000 pounds of raisins a day. The seeded fruit sells for three times the price of the ordinary raisins.

—One thousand bags of onions and an almost equal number of boxes of pears, for which there was no sale, were this week given away and dumped in the bay from the San Francisco water front.

—Last Monday about $50,000 was paid to the employes at the Vallejo Navy Yard for two weeks' work. The steam engineering department is building twelve small launch engines costing $575 each.

—The American River Land & Lumber Co. at Placerville, Cal., has leased its timber lands and lumbering plant to George Marsh, who has a contract for 5,000,000 feet of lumber per annum for five years.

—Truckee is building a little narrow-gauge road on the plan described in the last two issues of this paper. It runs but eight miles up into a hitherto inaccessible mountain chain, but is a starter. A road from Stockton to Calaveras Co. is also projected.

—At Nogales, Arizona, was last week incorporated the Calabasas Irrigation, Land and Water Co.; A. O. Brummell, M. R. Wise, R. Fley, D. F. Manlove; capital stock $3,000,000. The company proposes to irrigate 500,000 acres of land in the vicinity of Calabasas, Arizona.

—The California Beet Sugar Estate and Land Company, Limited, organized in this city last week. Directors—J. F. Gilmore of London, W. Easton, G. Easton, V. Neale, H. Francis, V. D. Duboce, A. H. Quatman; capital stock, $2,500,000, of which $2,485,000 has been subscribed by Director Gilmore.

—The Colusa Stone Company, which secured the contract for the stone work of the new Union depot, at the foot of Market street, San Francisco, now refuses to proceed until a final judgment of the State Supreme Court confirms their contract. Meanwhile the iron work goes on, and the Twentieth century will see the work of beginning the stone work well in hand.

—The Spokane and Leavenworth Coal Company has been incorporated at Spokane, Wash., capital stock $1,000,000; S. T. Arthur, P. E. Fisher, of Spokane, J. W. Arthur, F. A. Losecamp and J. F. Buttels, of Leavenworth. The coal field to be developed is located at Leavenworth, on the Great Northern Railroad. The company expects to be hoisting coal by September 1st.

—An English company has leased the Tehauntepec Isthmus Railway from the Mexican Government, agreeing to complete the work, improve the harbors at the Atlantic and Pacific termini of the road and put on a line of freight vessels between Salina Cruz—the Pacific coast terminus of the road—and this city. This is a matter of considerable importance to San Francisco, especially if the English company makes good its agreement to create suitable harbors at each end and remain an independent competitive line.

—The Government will not allow lumber to be shipped out of Alaska, but there are a number of mills in the field for the local trade. Most of the large canneries and mining companies own mills. The newest mill is that of LaDue & Harper, near Circle City, which, with the exception of one at Fort Cudaby, enjoys the honor of being farther north than any other sawmill in North America. Common lumber is worth from $60 to $100 at the mills. The most interesting mill is that of Rev. William Duncan at New Metlahkahtla, which is operated entirely by an Indian crew. The mill can cut about 25,000 feet per day for local purposes, and furnishes power for an electric-light system also operated by the natives.

—Dealers say that never before in the history of Oregon has the wool situation been anything like what it is at the present time. Heretofore there has always been a market for wool at some price. There has always been money in the past, plenty of it, to advance to any and all who wanted to consign their wool. People have held back for better prices in days gone by, but when the time came that they had to sell there were always buyers ready to pay the market price. Now there is no market, no price, no buyers—none who will make advances. The wool business is at a dead standstill. Mountains of wool, one of the mainstays of eastern Oregon, is tied up, and, for the present needs, is as worthless as the sands of the Columbia; 20,000,000 pounds of wool in eastern Oregon towns alone, and no one to even advance enough money on it to pay freight from one town to another. This wool is stored in warehouses at Huntington, Elgin, Baker City, Union, Durkee, Pendleton, Heppner, Echo, Arlington and The Dalles. Some of the producers of this wool will, however, give the usual eastern Oregon majority for "free trade and competition with wool the world over" next November.

Personal.

J. X. FERGUSON is the new superintendent of the Bonneville mine, Baker city, Or.

SUPT. BROWN, of the Poorman, Idaho, mine, has resigned to take a similar position in a New Zealand mine.

A. D. GASSOWAY, formerly superintendent at the Mayflower mine, is now superintendent of the Magalia, Butte Co., drift mine.

H. T. Power, president of the Placer Co., Cal., Miners' Association, has been nominated for the legislature by the Republicans of that district.

M. SCHIEFFELIN, one of the first discoverers of Tombstone, Arizona, district, is prospecting in Inyo Co., Cal. Ed Schieffelin is prospering in southern Oregon mining operations.

JOHN HAYES HAMMOND, No. 8 Old Jewry, London, has renewed his appointment as consulting engineer to the Consolidated Gold Fields Company of South Africa for a term of three years from July 1, '96.

COUNT G. DE KERGOLAY and Baron de Boutray of Paris, members of the French syndicate owning hydraulic mines at Junction City, are here on a personal inspection of the properties, which are described on page 138 of this issue.

H. H. WEBB, formerly of this city, has been appointed consulting engineer for the Chartered Company at Johannesburg, to take up the work of John Hays Hammond who will remain in London. Mr. Webb, who is a graduate of the School of Mines of the University of California and a nephew of Irving M. Scott of this city, left here last year for Buluwayo, South Africa, to take charge of some of the same company's mines there.

Commercial Paragraphs.

THIS paper is in receipt of a copy of an authentic and much-needed map of Mariposa county, compiled by W. G. Luckhardt, M. E., showing clearly the position of all the old patented mines, and also the new mines upon which work is now going on. It is for sale by Taylor & Ward, 71 and 73 Stevenson street, San Francisco; price $1.50, postpaid.

A FAC SIMILE, reduced in size, is received of the award to the Roessler & Hasslacher Chemical Co. of New York, issued by the World's Columbian Commission on the occasion of the Chicago Exposition, "for a well-arranged exhibit of cyanide of potassium for mining purposes, showing various forms of preparation and packing, according to the particular use for which it is intended: a valuable and instructive exhibit." The award is handsomely framed in quartered oak. This company received five other awards at the same time, one being for novelty and practicability of an important modification in the method of desilverizing argentiferous lead by zinc. The addition of a small quantity of aluminum to the zinc prevents the formation of zinc oxide in the skimmings, and the consequent loss of silver. The substitution of electrolysis for distillation in the treatment of the argentiferous zinc is also an important change.

Recent California Mining Incorporations.

Somers Gold Mining Co., S. F.; V. H. M. MacLymont, W. E. Waters, T. C. Gorris et al; capital stock $1,000,000, $600 subscribed.

Berry Creek G. M. Co.; H. H. Lee, W. B. Lee, J. D. Drake, F. C. Gehricke, J. C. Diamond; capital stock $1,000,000, all subscribed.

Oro Fino Mining Company, San Francisco; W. C. Fitzsimmons and F. H. Fitzsimmons, C. P. Bagg, H. Gage, C. J. Decker; capital stock $200,000, $15,000 subscribed.

Richland G. M. and M. Co., S. F.; I. R. Wilbur, J. Rosenthal, T. Fox, E. D. Farish, L. Shores; capital stock $500,000, $125 subscribed.

Queen of Sheba G. M. Co., S. F.; G. A. Helmore, O. C. Wilbur, W. F. Drake, J. McMullin, J. G. Boyne, H. C. Hurlbut, M. J. White; capital stock $1,000,000, $450,000 subscribed.

The Price-Eaton Company, S. F.; capital stock $500,000, $300,000 subscribed; W. C. Price, E. Scott, G. W. Baker, F. Avery, J. W. Pew.

The Grass Valley Gold Mining Company, Oakland, Cal.: A. W. Brodt, T. J. McFessel, W. H. McNaughlin, G. Schutz and H. J. Lewis; capital stock $1,000,000; $72,000 subscribed.

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"HERCULES" MINING HOISTS.

In ordering a new 10-horse power Hoist the Texas Consolidated Gold Mining Company wrote: "We hope your 10-horse power outfit will be as good in proportion as the 4-horse power we now have; the latter can't be beat. We hoist 700 pounds 150 feet out of a perpendicular shaft, 30 to 35 tons in ten hours." The same company wrote later:

Please permit us to express our entire satisfaction with the 10-horse power Hercules Gasoline Engine and Hoist purchased from you last August. We have worked it for the last three months and find it to do excellent work; likewise the 4-horse power Gasoline Engine purchased some time ago, which is now being used for the lighter work. Yours very truly, TEXAS CON. GOLD MINING CO.

The Manhattan Mining Company now uses three of our Gasoline Engines for pumping on the lower levels at a cost of $9 per day for fuel and labor, as opposed to $36 per day for doing the same work by steam.

The Amalie Mining Company bought a 3-horse power "Baby Hoist" as an experiment, and within six weeks ordered another 6-horse outfit.

The HERCULES GASOLINE ENGINE AND HOIST is the most simple, compact and economical in the market—occupies less space and does more work for less money than any other Hoist.

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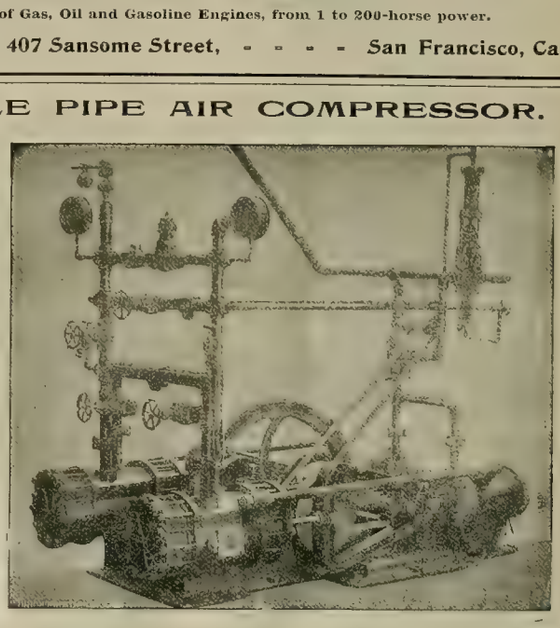

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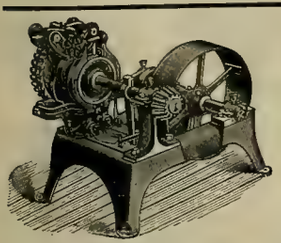

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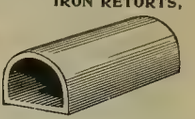

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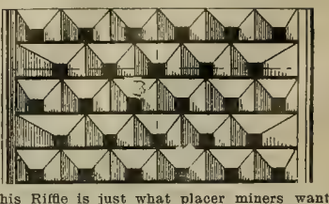

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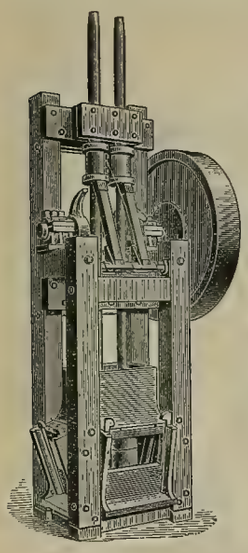

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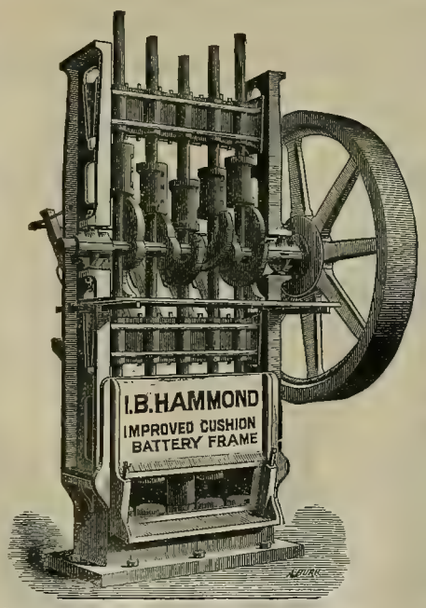

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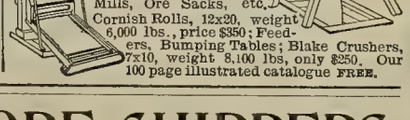

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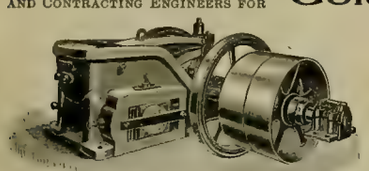

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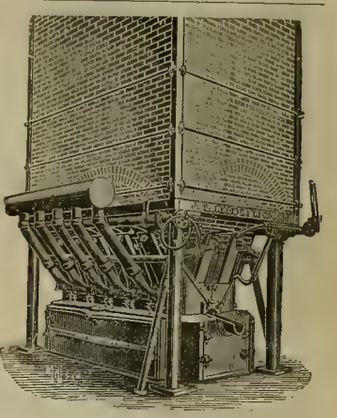

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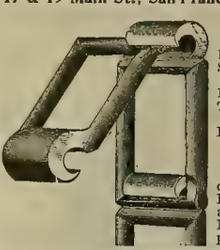

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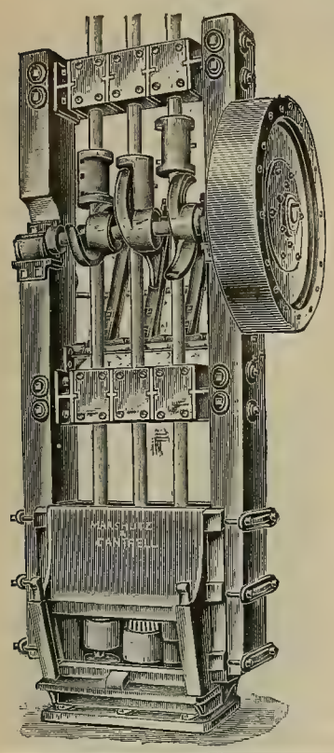

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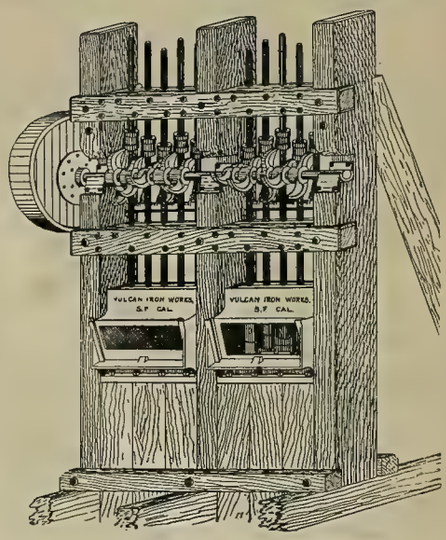

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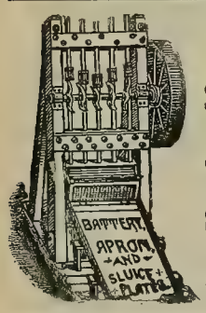

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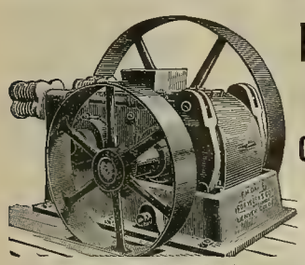

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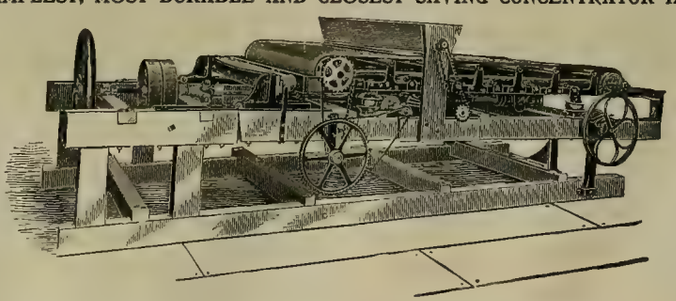
CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



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Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
E. L. BALLOU, Propr. Ballou Reduction Works.

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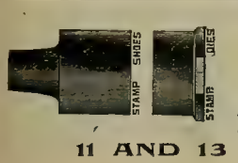

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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 13, 1896.

There is a continued good demand for all kinds of goods and mining machinery from the gold mining districts on this coast. From other sections the call for goods is of a hand-to-mouth character. It is stated that while the Presidential election attracts attention still it does not interfere with general trade the extent it has heretofore done. This, no doubt, is due to the small stocks of goods carried by the retail trade compelling steady assortment buying. The close money market in this city is also against extending much credit. Why the banks are pursuing the course they do it is hard to find out, for they are most certainly creating an uneasy and feverish feeling which may operate against them. With manufactures, particularly iron workers, there is a continued good. confidential feeling. The demand for mining machinery not only holds up well but an improvement is looked for this fall and next spring.

The local money market seems to be working closer, with banks discriminating against paper currency that has to be sent East for redemption. They charge a small discount, just enough to cover exchange. Singular as it may appear, there is a light call for remittance to the East, which is largely met by commercial bills drawn against produce shipments. It is also said that banks are drawing as much of their funds from the East as they can spare. This is also against Eastern exchanges. At the East the money markets have been more or less feverish and irregular. At New York interest on call loans have advanced and declined the same day, causing all kinds of speculative securities to move down or up, according to the supply of money. The European money markets are generally easy, having recovered from the eastern European complication scare. Gold has increased in supply, but silver has decreased.

MONETARY SYSTEM OF THE UNITED STATES.

In view of the large interest taken in the money question of this country the following compilation from official sources is of peculiar interest:

Gold Coin.—Weight, 25.8 grains to the dollar; has fineness of .900; no limit to issue; denominations, $20, $10, $5 and $2.50; has an unlimited legal tender quality; is receivable for all dues; is changeable for certificates under certain limitations.

Gold Certificates.—Issue suspended so long as free gold in Treasury is below $100,000,000; denominations, $10,000, $5000, $1000, $500, $100, $50; no legal tender quality; receivable for all public dues; exchangeable at Treasury for gold coin or any other money; redeemable in gold coin at Treasury.

Silver Dollars.—Weight, 412.5 grains to the dollar; ratio to gold, 15.988 to 1; issue limited to requirements to redeem Treasury notes; denomination, $1; unlimited legal tender quality unless otherwise contracted; receivable for all dues; exchangeable for silver certificates or smaller coins at Treasury; may be deposited for silver certificates.

Silver Certificates.—Issue limited to silver dollars in use; denominations $1,000, $500, $100, $50, $20, $10, $2, $1; has no legal tender quality; receivable for all public dues; exchangeable for dollars or smaller coins; redeemable in silver dollars.

United States Notes.—Issue $346,681,016 and in same denominations as silver certificates; legal-tender quality is the same as silver dollars; receivable for all dues (duties on imports by regulation only); exchangeable for all kinds of money except gold certificates; redeemable in coin at sub-treasury in New York and San Francisco in sums of $50 or over.

Treasury Notes of 1890.—Total issue $156,044,615 and in the same denominations as silver certificates; legal tender quality is the same as silver dollars; receivable for all dues; exchangeable for United States notes; redeemable in coin at Treasury and when so redeemed are cancelled and retired.

Currency Certificates.—Issued in $10,000 denomination; has no legal tender quality; exchangable for U. S. notes; redeemable in U. S. notes at sub-treasury where issued.

National Bank Notes.—Issue limited to volume of U. S. bonds and their cost and in the following denominations: $1000, $500, $100, $50, $10, $5; has no legal-tender quality; receivable for all dues, except duties and interest on public debt; exchangeable for silver and minor coin; redeemable in lawful money at Treasury or bank of issue.

Subsidiary Coins.—Weight, 385.8 grains to the dollar; ratio to gold, 14.953 to 1; issue limited to needs of the country and in denominations of 50 cents, 25 cents and 10 cents; legal-tender not to exceed $10; exchangeable for minor coins; redeemable in lawful money at Treasury in sums of $20 or any multiple.

Minor Coins.—Silver 5-cent piece, 77.16 grain; nickel 5-cent piece, 75 per cent copper and 25 per cent nickel; silver 1-cent pieces, 48 grains; copper 1-cent, 95 per cent copper, 5 per cent tin and zinc; issue limited to needs of country; legal-tender quality not to exceed 25 cents; redeemable in lawful money at Treasury in sums of $20 or over.

New York Silver Prices.

NEW YORK, Aug. 13.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	31 5-16	68½
Saturday	31¼	68⅜
Monday	31¼	68¼
Tuesday	31 3-16	68
Wednesday	31⅛	67⅞
Thursday	31⅛	67⅞

	Copper.	Lead.	Iron.	Tin
Friday	11 00	2 70	10 25@12 50	13 30
Saturday	11 00	2 75	10 25@12 50	13 30
Monday	11 00	2 75	10 25@12 50	13 30
Tuesday	11 00	2 75	10 25@12 50	13 35
Wednesday	11 00	2 75	10 25@12 50	13 35

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	.5
New York Telegraphic Transfer	.7½
London Bankers' 60 days	$4.83
London Merchants	$4.86½
London Sight Bankers	$4.89½
Refined Silver, per oz., 1000 fine	68½
Mexican Dollars	53¼@54½c

All exchanges are nominal.

SILVER.—The market has been slowly declining. This is contrary to what had been expected and in the face of the miners' strike at Leadville reducing the output in this country. The demand is slow for export both on this coast and at the East while the speculative call seems to have largely died out. The steamer Belgic for the Orient took out $170,871 in bullion. The exports from this port during the first seven months of this year aggregate $3,437,000. During the first seven months of the year, silver shipments from London to Africa, India and the Straits were £3,005,523, against £3,795,500 during the same time in 1895. India has taken £1,913,578 this year, a decrease of £280,000. China has taken £574,413, or only a little over one-half of the amount taken in 1895. The shipments to the Straits are about the same as last year.

MEXICAN DOLLARS.—The market is quiet, with quotations largely nominal, ranging from 63¾c to 64¼c, according to quantity and quality. The steamer Belgic took out 61,414 dollars to China.

COPPER.—The market has held fairly firm both on this coast and at the East. The strength is largely due to advices from Europe to the effect that the visible supply of copper on August 1st was 34,180 tons, against 36,300 tons July 1st and 36,910 tons June 1st, while the deliveries were 19,500 tons in July, 15,400 tons in June and 17,800 tons in May.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The market is quoted lower. The domestic demand is slack, but there is a continued good export movement to the west coast of Mexico.

Domestic trade, per flask	36 00

For export quotations are nominal, but less than for home.

ANTIMONY.—The demand is fair, with the market steady at 7¾@8¼c in a jobbing way. New York mail advices quote 7¾@7¼c for Cookson's, 6¾c for Hallett's and 6¼c for Japanese, from store.

LEAD.—The market is lower and weak at the decline, both here and at the East.

Pig	3 65	@	—
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—The market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—There is very little business passing. The decline in silver is against the market. For plates the market is flat, both here and at the East.

Pig, per lb	14¼
Plate, I C coke, heavy, per box	$4 10@ —
" " " light, "	4 00@ —

BORAX.—The market is quoted as follows

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	6¼
Concentrated, "	5⅝

POWDER.—There is a continued good demand for mining purposes.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

IRON.—There is a fair consumptive demand. The market favors buyers. The East reports a slow market, with production curtailed.

COAL.—Imports and consumptive demand are about the same. So far as we are to learn quotations are unchanged. The bark Theobald has arrived from Cook's Inlet with a cargo of Alaska coal. It is of much better grade than that heretofore brought and consequently it finds a ready market.

Mining Share Market.

SAN FRANCISCO, Aug. 13, 1896.

Trading has been quite light, with even cross-orders not so much in evidence. The latter were only used to keep prices down, so the manipulators could buy the few shares thrown out by disgusted holders. It would seem as if the depression of the market and poor official advices from the mines have been done largely to keep outsiders from buying and also kill time until more assessments could be levied, by which holders of shares can be squeezed still more. Reports are current that quite a line of assessments are to be levied, even including Con. Virginia. That they will prove correct in the course of time can not be gainsaid, but how soon it is impossible for the writer to say. They may come on when prices are about bottom, and then again they may be put on when the market is nearing top, for that there is a small deal on hand is among the certainties, but how soon it will start is among the uncertainties. There have been and still are strong buyers in the market, who have been taking all the shares possible at the declining prices of the past four weeks. Of necessity, they made small rallies, so as to buy at the advance as well as on the decline. Under these purchases, shares in some of the mines have been well concentrated, but it remains to be seen what success will be met by the manipulators when they attempt to unload at higher prices. The money market is said to be against a deal, owing to banks not being of an accommodating turn of mind, while it is claimed in well-informed circles that inside managers of the mines are not prepared, and will not be for some time to come, to show up much ore, and without a good-sized showing moneyed outsiders will be slow to take hold. While saying this, the action of the market indicates that an attempt will be made to advance the shares of one or two of the mines, in which movement the entire list will sympathize, and their leader, it is quite safe to assert, will probably not be that in the last little deal, when Chollar went from 35 cents to $4.30. This opinion is not based on information, but on the workings of all former small deals, and also to the fact that the news from Chollar is most too good at current prices.

From the Comstock mines our advices, taken as a whole, are of quite a favorable character, yet ore can be found and covered, work stopped or else turned in the wrong direction and outside shareholders be made to suffer. In the Alta winze on the Keystone vein they were in fair grade ore according to the official letter. In the other Devil Gate mines no work, so far as the public know, is being done. From the Gold Hill mines our advices are to the effect that no work is being done in Caledonia. In Overman they are raising a few tons of ore. It is reported that there was a strike of ore a short time ago in this mine, but the information has been kept back. Seg. Belcher and Belcher are still raising fair grade ore each week, but not enough to pay current expenses. In Crown Point they are still taking out ore from the 1100-foot level for testing. One run of a 110 tons only gave battery assays of $5.90 per ton, gold. Unless the remainder of the ore for testing proves richer this deposit will not pay to extract and mill. Exploiting work is underway in the 650-foot level. From Kentuck and Yellow Jacket no advices are at hand. The air connection in Confidence has admitted of a resumption of ore extracting but, as yet the quantity is small and grade fair—only assaying a little over $20 a ton. It is not at all impossible that more active exploiting work will be inaugurated before long in both Confidence and Challenge. In Con. Imperial the long west crossdrift is out now 640 feet. Fair progress is also being made in west crossdrift No. 3. In Alpha and Bullion no change in the working is reported in official letters. From the middle mines our advices are to the effect that in Potosi on the 450-foot level they continue to encounter stringers and beams of ore. The formation, taken as a whole, is said to be favorable. In Chollar they were at last official advices in 3 feet of fair ore at two places in the mine. They extracted the past week 102 tons of fair grade ore which is being stored for milling. In Hale & Norcross they are working on the 900-foot level and also following a small streak of high grade ore. A few tons from this was extracted which assayed over 62½ ounces in silver to the ton. In Savage work is continued on several levels. On the 950-foot level work is to the Hale & Norcross line. In the northend mines work in both Gould & Curry and Best & Belcher is to the east from the Bonner shaft level. In Con. Virginia we are not advised of any material change in the situation. It is said that the water has risen to within a few feet of the 1750-foot level, but as the ore they are extracting is above the Comstock tunnel level no danger from this source is expected, the only danger is that the ore will run out. Good progress is being made in getting the old bonanza excavation in good condition so there will be no trouble in the future from fire and gas. In Ophir fair progress is being made in the Central tunnel and 1000-foot levels. While the formation is said to be favorable the ore only assays from 50 cents to $2 a ton. Work is continued in the 1000-foot level of Mexican towards the west. No change is reported in official letters. From the Union and also Sierra Nevada shaft they continue work on the north drift from the raise 190 feet above the sill floor of the 900-foot level. They are also driving an east crossdrift. In Sierra Nevada work is continued in the Layton tunnel level. In Utah they are driving a west crossdrift from the mouth of the south drift. They are still at work in Andes in the 450-foot level. Formation is unchanged.

From the Brunswick lode, while our advices continue encouraging, yet they are not of a character to excite the cupidity of outside operators. If what has so far been found in that lode had been found in the Comstock lode it would not have excited much attention, but it is the chance of finding a large body of ore in the former that keeps interest alive. The lode is comparatively an unknown quantity, and therefore the ore already found is said to be sufficient to cause men with money to gamble on its yet being something big, or else a failure when compared with the Comstock. In Chollar they are still pushing south on the 300-foot level, and run into and out of the ore every two or three days, which causes the shares to advance and then decline. So far there has been a decided improvement in the 300-foot level over the 200-foot level. In Hale & Norcross they are driving the north drift towards the Savage line, and also sinking the winze to the 400-foot level. The latter they will reach and commence drifting south by the latter part of this month. Mining men look for a decided improvement in this level over the 300-foot level. In Savage there is no change in the work. In Gould & Curry there is active exploiting work. The joint winze being sunk by Con. Virginia and Best & Belcher will be soon deep enough to open out a level for exploiting. The winze in Occidental below the 750-foot level was, at last advices, in 2 feet of $50 ore. Exploiting work is being done on the other levels.

From the Bodie district our advices are to the effect that active work is being done on the 200-foot and 300-foot levels. On the 450-foot level of this mine Mono is working to the Mono line so as to strike the Fortuna vein in the latter mine where it has not been worked before. In Bulwer the more active work is being done in several levels. They extracted thirteen tons of ore assaying $66 to the ton. In Bodie they are placing the electrical machinery to replace that burnt some time ago. This machinery is used for hoisting and pumping purposes.

In Silver King, Arizona, in the raise to connect with the winze they struck 2 feet of milling ore.

The market was dull and heavy to-day with some outside selling which caused a slight demand in all the shares except Chollar and Hale & Norcross. Everything that can is being done to squeeze outsiders out of their holdings before an upmove gets in. Con. Virginia, it is said, will not be assessed as the company has $8500 cash in hand and will have by the end of the month 1000 tons of ore to be milled which assays about $100 to the ton. Crosscutting will be commenced soon on the 1650-foot level. From the Chollar's Brunswick working advices received to-day state that the south drift on the 300-foot level is looking well and no crosscutting will be done so long as the ore continues as they go south. The drift is out 145 feet from the north line. This is a most excellent showing. The ore in the Occidental winze has widened to 2½ feet and is of better formation.

The following illustrates the changes of the week:

MINES.	Aug. 6.	Aug. 13.
Alpha		$ 06
Alta Consolidated		
Andes	$ 31	30
Belcher	33	
Best & Belcher	88	90
Bodie		
Bullion		14
Challenge	40	
Chollar	2 50	2 25
Confidence	1 00	91
Consolidated California and Virginia	1 75	1 70
Consolidated New York		
Crown Point	34	35
Exchequer	05	
Gould & Curry	08	61
Hale & Norcross	1 15	1 25
Justice		
Mexican	50	51
Ophir	1 05	95
Overman		15
Potosi	1 15	
Savage	68	60
Sierra Nevada	53	47
Union	46	40
Utah		
Yellow Jacket	37	

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alpha Con M & M Co, Nev	17	10c	Aug 3.	Sept 7. Sept 29.	C E Elliott, 309 Montgomery
Belcher S M Co, Nev	53	25c	Aug 5.	Sept 10. Sept 30.	C L Perkins, Mills Building
Anita G M Co, Cal	10	7c	July 20.	Aug 25. Sept 15.	L F Reichling, 404 Montgomery
Best & Belcher M Co, Nev	60	25c	July 2.	Aug 6. Aug 27.	M Jaffe, 309 Montgomery
Channel Bend M Co, Cal	3	5c	June 23.	July 31. Aug 22.	J P Langhorne, 39 Sutter
Confidence S M Co, Nev	27	30c	July 30.	Sept 3. Sept 24.	A S Groth, 414 California
Con Imperial M Co, Nev	37	1c	July 24.	Aug 27. Sept 22.	C L McCoy, Mills Building
Gold Bar Con M Co, Cal	4	2c	July 13.	Aug 20. Sept 21.	E C Godfrey, Crocker Bldg
Jamison M Co, Cal	8	5c	July 6.	Sept 7. Sept 28.	Sam W Cheyney, 120 Sutter
Marguerite G M & M Co, Cal	3	10c	June 18.	July 28. Aug 28.	Chas. Winters, 237 Twelfth
Sierra S M Co, Nev	111	25c	Aug 7.	Sept 11. Oct 1.	E L Parker, 309 Montgomery

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
North Pacific Mining & Transportation Co.	E D Farish, 632 Market	Aug 17

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Orders executed in large or small amounts for cash or on *reasonable* margins. Out-of-town orders by mail, telephone or telegraph will receive prompt attention. Daily market circular mailed free on application.

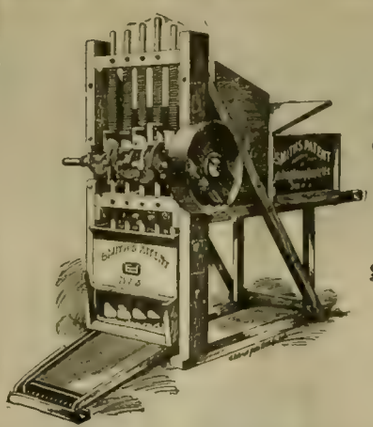
An Ex-Supt. and Mining Engineer,

Lately returned to California, desires a situation. Best of references. Address No. 37, this office.

SITUATION WANTED

By an experienced Amalgamator and Mill Man who thoroughly understands his business. References furnished. Address W. A., this office.

Smith's Improved STRIKING STAMP MILL.



Your Attention Is Called To the Fact

THAT SMITH'S LATEST IMPROVED CALIFORNIA TUBULAR STAMP STRIKING QUARTZ MILL

Is easy to handle, and its cheapness of operation, combined with the low price of the Mill and the ease with which it can be moved from place to place, gives it greater and more perfect results than all others of its kind. We use the best **imported** material that can be had, and guarantee all parts of the Mill for six months. Two sets of Power Striking Steel Springs are furnished with each Mill. This is the Greatest Gold and Silver Mine Opener and Developer now on the market, and can be had complete and ready to operate at the low price of **$250.00.** It is the poor miner's chance to obtain the best Mill made with all the latest improvements. Water tanks ore feeders, silver plates, and everything necessary ready to attach power. Seventy five Mills are now in actual operation. **SEND FOR ONE AND TRY IT.** Also send us your friends' address and we will send free of charge our Mill Catalogue and Price List, together with other information desired.

$250.00 Will Buy a Complete SMITH MILL.

Greatest mine opener of the age.

Can be taken into the remotest regions at a trifling cost.

The poor miner's surest friend.

The most durable Mill on the market.

The cheapest Quartz Mill on earth.

Address ALPHONSO B. SMITH,
BOX 1,
228 W. FOURTH STREET. ....LOS ANGELES, CAL.

This Mill strikes 250 blows per min. and crushes 2½ tons in 12 hrs. The only Combined Hand Power or Motor Power Mill on Earth.

(PATENTS APPLIED FOR.)

San Francisco Stock Board Sales.

SAN FRANCISCO, August 6, 1896

9:30 A. M. SESSION.

200	Alpha	06	100	Mexican	51
100	Best & Belcher	89	600	Occidental	64
100	Bullion	14	100	Ophir	95
150	Challar	2 25	700	Overman	15
150	Con Cal & Va	1 70	300	Savage	60
100	Confidence	91	200	Scorpion	06
100	Crown Point	35	100	Sierra Nevada	47
300	Gould & Curry	61	200	Union	40
400	H. & N	1 25			

SECOND SESSION—2:30 P. M.

100	Best & Belcher	90	100	Ophir	95
450	Con Cal & Va	1 70	200	Overman	15
450	Challar	2 25	50	Union	39
200	H. & N	1 25	250	Andes	30
300	Crown Point	34			

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUGUST 4, 1896.

565,151.—GRAVEL WASHER—T. G. Barlow-Massicks, Phœnix, A. T.

565,152.—AMALGAMATOR—T. G. Barlow-Massicks, Phœnix, A. T.

565,132.—DREDGER—A. B. Bowers, S. F.

565,378.—WHEEL—E. S. Cobb, S. F.

565,201.—VEHICLE—J. C. F. Dick, Kenwood, Cal.

565,202.—DISTRICT ALARM—F. Drake, S. F.

565,338.—GUARD RAIL—J. W. Ernest, Los Angeles, Cal.

565,339.—FOLDING TABLE—J. W. Ernest, Los Angeles, Cal.

565,264.—CARPET SEWING MACHINE—H. Eschweiler, S. F.

565,203.—ADJUSTABLE SHADE—A. F. Espersen, Tacoma, Wash.

565,340.—STEAM COOKER—Finley & Wilson, Silverton, Ogn.

565,138.—REGULATION OF POWER—H. B. Gale, S. F.

565,162.—KEY-OPENING CAN—W. H. Gilbert, Oakland, Cal.

565,351.—REFRIGERATOR CAR—C. S. Hardy, San Diego, Cal.

565,168.—SASH FASTENER—F. E. Jarvis, Oakland, Cal.

565,358.—TARGET METER—R. F. Langer, S. F.

565,288.—SAW TOOTH—J. R. Luce, Everett, Wash.

565,175.—ICE PALACE—C. F. McGlashan, Truckee, Cal.

565,176.—PULVERIZING MILL—Thos. McGlew, S. F.

565,416.—WATER FILTER—C. C. Moore, S. F.

565,173.—VALVE FOR SIPHON BOTTLES—F. E. Morrill, S. F.

565,231.—CHAIR SEAT—F. Ring, Portland, Ogn.

565,181.—POTATO DIGGER—T. E. Sadler, Reno, Nev.

565,145.—SIGNATURE GATHERER—D. M. Smyth, Pasadena, Cal.

565,146.—SIGNATURE GATHERER—D. M. Smyth, Pasadena, Cal.

565,395.—VIOLIN BOW—E. O. Spitzner, Portland, Ogn.

565,241.—CLUTCH PULLEY—J. N. Starr, Snohomish, Wash.

565,192.—SHADE AWNING—C. J. Waterhouse, S. F.

25,858.—DESIGN FOR INHALER—C. W. McKee, Phœnix, A. T.

25,852.—DESIGN FOR SPOON—A. F. Shriver, Newcastle, Cal.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

KEY OPENING CAN.—Wm. Henry Gilbert, Oakland, Cal. No. 565,162. Dated Aug. 4, 1896. This invention relates to that class of key-opening cans in which a wire is folded within a portion of the can or its cover and has one end projecting adapted to be grasped or taken hold of and caused to tear the fold in which it lies. The object of the invention is to provide a key-opening can of a simple construction, providing for the effective disposition of the opening or tearing wire and especially providing by the peculiar bending or construction of the flange for leaving the edge of the can throughout its entire circumference folded upon itself, and with a finished edge after the wire has been torn out, thereby adapting the can for other uses, such as a pail, a cup or such like vessel, requiring a finished and smooth edge. The device consists of a can, the end of the body of which is provided or formed with an exterior V-shaped flange or trough, and a wire lying in the base fold of said flange or trough with its end projecting so that when force is applied to it, the wire will tear through said base fold and thus sever the outer wall of the flange or trough and relieve the attached head or cover so that it may be separated from the body of the can.

POTATO DIGGER AND SEPARATOR.—Thomas E. Sadler, Reno, Nev. No. 565,181. Dated Aug. 4, 1896. This device relates to the class of machines for digging potatoes and separating the earth therefrom whereby they are left clean. The device consists generally in a peculiar shovel having grating wings on each side, and in connection therewith of a peculiarly mounted and operating separator grater. These parts, namely, the shovel wings and the separator grater have a reciprocating or vibrating movement by which the separation of the dirt from the potatoes is effected.

Obituary.

PROF. A. D. CHURCHILL died of sunstroke in Chicago last Wednesday. He was a geologist of considerable reputation and a prominent mining expert in Helena, Montana.

"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colo.

WILL NEGOTIATE with owners or their duly authorized agents only.

WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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Marquette, Mich., U. S. A.
Operator and Dealer in
Mines, Mining Properties and Mineral Lands,
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MONEY LOANED ON BONA-FIDE MINES.

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

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Assay and Chemical Work Done on Reasonable Terms.

Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.

DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Walter Shackleford, in the Jack's Ranch Mine, near Meadow Valley, Plumas Co., to deposit tailings in an old pit; from J. F. Cowdery, in the Sacket's Gulch Claim, near St. Louis, Sierra Co., to deposit tailings in a ravine; and from Cadematori & Pelrano, in the Barnhardt Mine, near San Andreas, Calaveras Co., to deposit tailings in Grub Gulch, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on August 24th, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from George Beattie, in the Beattie and Parsons Mines, near Georgetown, El Dorado Co., to deposit tailings in Big Canyon Creek, and from Richard Phelan, in the Hilda Mine, near Sierra City, Sierra Co., to deposit tailings in a ravine, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on August 31st, 1896, at 1:30 P. M.

ANNUAL MEETING—The regular Annual Meeting of the stockholders of the North Pacific Mining and Transportation Company will be held at the office of the Company room 5, No. 632 Market St., San Francisco, California, on Monday, the seventeenth (17th) day of August, 1896, at the hour of 1 o'clock p. m., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Wednesday, August 12th, at 3 o'clock p. m.

E. D. FARISH, Secretary.

Office—Room 5, No. 632 Market street, San Francisco, California.

Assessment Notices.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 18th day of July, 1896, an assessment (No. 4) of Two cents (2c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 38, Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of August, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 21st day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, alifornia.

CONSOLIDATED IMPERIAL MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors held on the 24th day of July, 1896, an assessment (No. 37) of One (1c) Cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 35, third floor Mills Building, corner of Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 27th day of August, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on TUESDAY, the 22d day of September, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. McCOY, Secretary.

Office—Room 35, Third Floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

BELCHER SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 5th day of August, 1896, an assessment (No. 53) of twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 37, third floor, Mills Building, N. E. corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of September, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on WEDNESDAY, the 30th day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. PERKINS, Secretary.

Office—Room 37, third floor, Mills Building, N. E. corner Bush and Montgomery streets, San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Little Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 8) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 31st day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

POSTPONEMENT.

At a meeting of the Board of Directors o the Jamison Mining Company, held on the 22nd day of July, 1896, it was resolved that any stock upon which the assessment shall remain unpaid on the seventh day of September, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, September 28th, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

SAM W. CHEYNEY, Secretary.

NEWSPAPER WANTED.

An experienced publisher, (who is a practical printer), desires to lease a newspaper or to take a situation, temporarily, with a view to purchasing an interest in or the entire business. Mining county preferred. Address "H. S. S.," care of Mining and Scientific Press, San Francisco.

FOR SALE!

A Large and Well-Equipped Gravel Mine.

This is a regular producer, netting from $1500 to $3000 per month. Reasons for selling will be explained to a bona-fide purchaser. Address, **GOLD MINE, P. O. Box 66, Placerville.**

GOLD MINING PROPERTIES.

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

FOR SALE.

4,000 Feet 3-in. 4-in. and 6-in. Pipe, suitable for mines, irrigation, or village water works system. W. F. THOMPSON, 40 Main Street, S. F.

It Is a Fact

THAT OUR ANNUAL PRODUCT OF . . . . . .

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EXCEEDS that of any other manufacturer in the United States, and Includes Everything in the Electrical Line. . . . . .

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8 and 10 PINE STREET, SAN FRANCISCO, CAL.

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Fossil and Asbestos Sectional Covering,

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Special Rates for Steam Boilers and Drums

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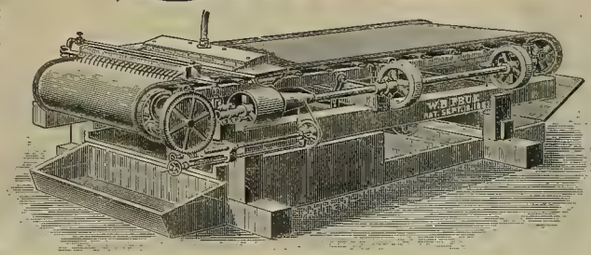
FRUE ORE CONCENTRATOR.

OVER 4200 IN ACTUAL USE.

Manufactured under Patents of

April 27, 1880;
September 18, 1883;
July 24, 1888;
March 31, 1891.
July 18, 1893.



It can be safely stated, without going into a description of several new and untried concentrators that have lately come into the market, that where sulphurets are of such value as to make close saving necessary, the Frue Vanner is always used. It is the only endless belt concentrator in the market that can be relied on to handle all classes of ores, and give universal satisfaction. (In all competition of concentrators the Frue Vanner is taken as the standard machine of the world and all comparisons made by it. There have been over 4200 of these machines sold, 1700 having been sold on the Pacific coast alone.) They are in use in every part of the world where mining is carried on and in all cases they are giving perfect satisfaction. From time to time valuable and important improvements have been made in this machine to increase its capacity and durability, and particular attention is called to the Patent Lip Flange for the rubber belt, which does away with nearly all the strain and cracking, as in the old style of flange, making the life of belt more than double that of other style belts in the market. The lip of flange bends outward in going over the large end rolls, thereby distributing the strain in the solid rubber, and bringing virtually no strain either at the edge or at the base of flange, as is the case in all belts with a raised edge.

For any information, pamphlets, circulars or testimonials, call on or address

Price of 4-foot wide Plain Frue Vanner ..... $500, f. o. b.
" " " Improved Belt Frue Vanner..... 600, f. o. b.
" 6-foot " Plain Belt Frue Vanner..... 600, f. o. b.

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(Successor to ADAMS & CARTER), 132 Market St., Room 15, San Francisco.

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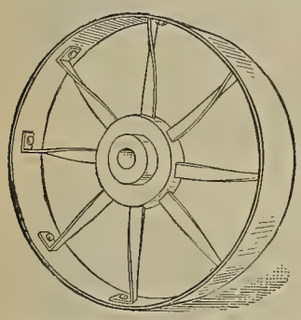

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AIR COMPRESSING MACHINERY A SPECIALTY.

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MINING AND MILLING MACHINERY,

ADAPTED TO EVERY DESCRIPTION OF MINING AND MILLING.

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ROPP STRAIGHT LINE FURNACE
FOR ROASTING, CHLORINATING AND DESULPHURIZING ORES.

KNOWLES STEAM PUMPS. LIDGERWOOD HOISTING ENGINES.
DODGE ROCK BREAKERS AND PULVERIZERS.
INGERSOLL-SERGEANT ROCK DRILLS AND AIR COMPRESSORS.
WOOD WORKING, IRON WORKING AND SAW MILL MACHINERY.

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For the **Transportation of Ore, Fuel and other material over mountainous and rugged country the HALLIDIE ROPEWAY** stands pre-eminent as to simplicity, efficiency and economy.

Parties desiring to remove large quantites of Sand, Gravel, Earth, Ore, Rock, etc., to construct levees, dams or embankments, or to make long cuts, as in canals, ditches, etc., can do more efficient work at less cost by the HALLIDIE SYSTEM OF ROPEWAY TRANSPORTATION than by any other system.

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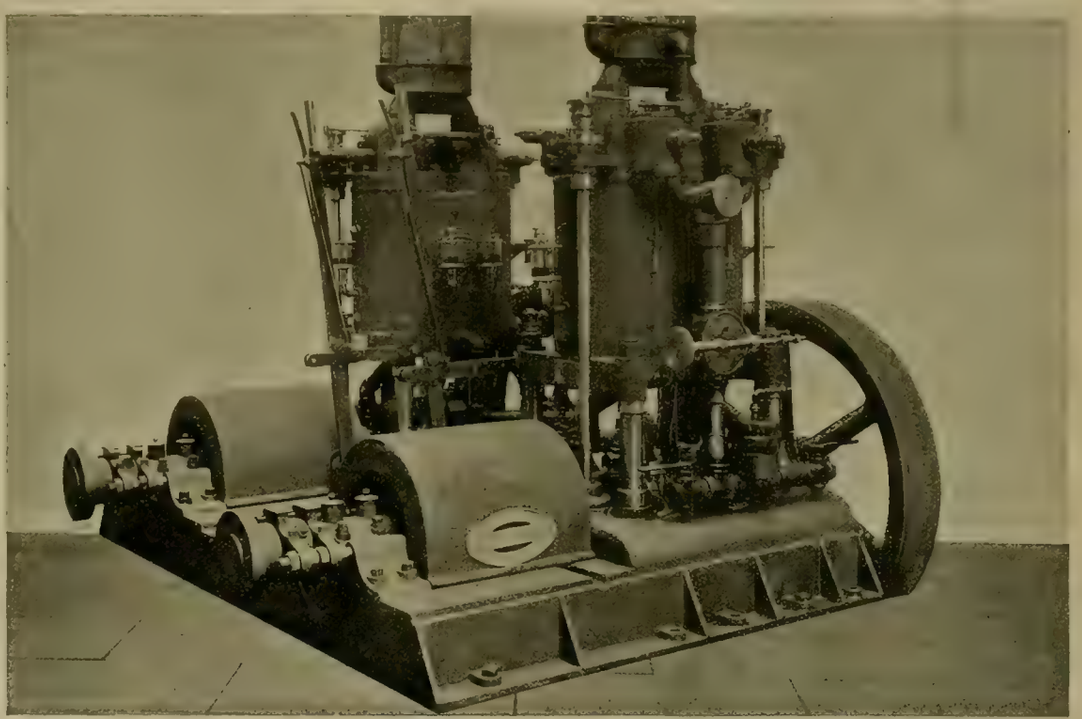
MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1885.—VOLUME LXXIII. Number 8. SAN FRANCISCO, SATURDAY, AUGUST 22, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Twin-Screw Gasoline Marine Engines.

The accompanying cut shows a pair of duplex 40 H. P. "Union" engines, for driving a twin-screw passenger boat on the Columbia river, built by the Union Gas Engine Company of San Francisco. This company has been building gasoline engines for many years, and has constructed some of the largest marine engines in the world, but the engines here shown are the first built of this type. These engines were built to fill the second order received from the Ilwaco Railway and Navigation Co., the first order being for a 20 H. P., which has been in use for the past three years.

It is a notable fact that the first successful cable passenger railways were built in San Francisco, and the first successful gasoline marine engines were also invented here, which speaks well for our engineering ability. The gasoline engine, as built by the Union Gas Engine Co., is not only a handsome and durable machine, but its simple and accurate governing device, and other mechanical details, show a very high degree of mechanical engineering skill.



DUPLEX "UNION" MARINE ENGINES.

QUICKSILVER receipts at San Francisco for the first six months of '96 aggregated 15,706 flasks of 76½ pounds each, the largest for any six months since '86. The exports by sea for the corresponding period were 8,549 flasks, worth $313,367; by rail during the same period went 6,162.

FROM many quarters comes news of suspension and curtailment of various forms of business "till after election." No such stagnation exists in any business directly or indirectly connected with gold mining. The utmost activity prevails, with promise of continuance.

FIG. 3.—SECONDARY OF MOTOR.

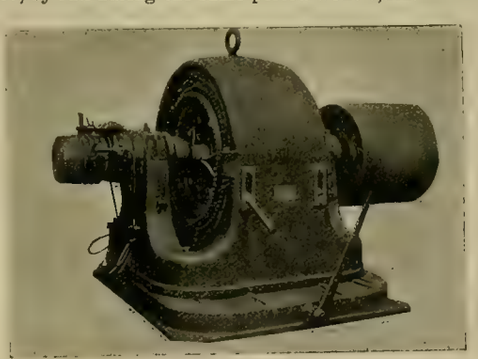


FIG. 1.—300 H. P. MOTOR

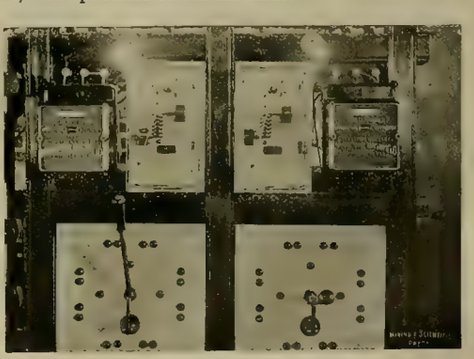


FIG. 5.—THE SWITCHBOARD.

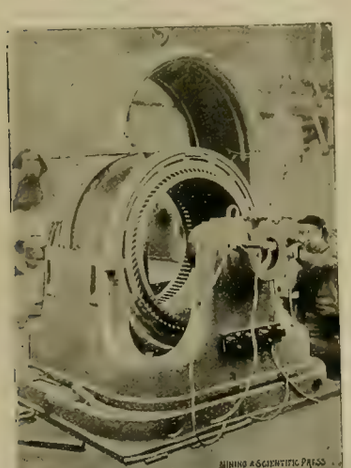


FIG. 4.—THE CAST-IRON FRAME.

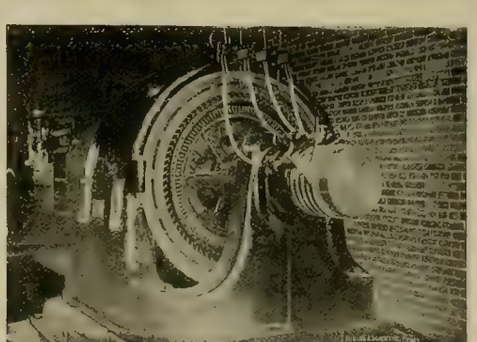


FIG. 2.—ONE OF THE MOTORS IN THE STATION.

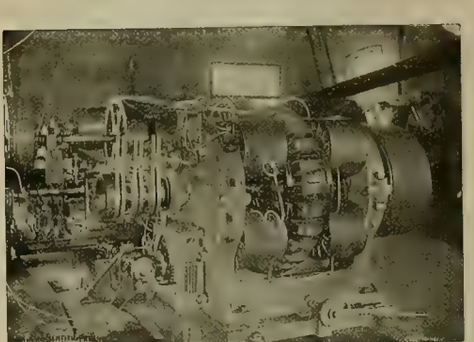


FIG. 6.—100-LIGHT BRUSH MACHINE.

THE LATEST IMPROVEMENTS IN ELECTRICAL DEVELOPMENT. (*See page 154.*)

MINING AND SCIENTIFIC PRESS.

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Our latest forms go to press on Thursday evening.

J. F. HALLORAN.....General Manager

San Francisco, August 22, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Duplex "Union" Marine Engines; The Latest Improvements in Electrical Development—300 H. P. Motor; One of the Motors in the Station; Secondary of Motor; The Cast-Iron Frame; The Switchboard; 100-Light Brush Machine, 149. A New Fly Wheel, 153.

EDITORIAL.—Twin-Screw Gasoline Marine Engines, 149. Great Investment of Capital in the Bicycle Business; Raising Auriferous Gravels; Foreign Capital in California; County Mineral Exhibits; Mining Blunders; The Geological Survey and Mining, 150.

MECHANICAL PROGRESS.—A New Construction for Fly Wheel; Cause of Pitting and Corrosion, 153.

SCIENTIFIC PROGRESS.—Change in the Manufacturing Industry; To Prevent the Chemical Action of Acids, 153. A New Magnet, 154.

ELECTRICAL PROGRESS.—Latest Development in Electric Motors; Electrical Conductivity of Aluminum; Wonders of the X-Ray, 154.

PRACTICAL INFORMATION.—Tempering Steel: Different Kinds of Engines, 154.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 158-9.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 166.

MISCELLANEOUS.—Concentrates, 151. Vein Walls; The Accumulation of Amalgam on Copper Plates, 152. Silver and Gold Holdings; Coinage of Silver During 1895; Recent California Mining Incorporations; Commercial Paragraphs, 154. California Mines and Miners; Notices of Recent Patents, 155. Coast Industrial Notes; Personal; Recently Declared Mining Dividends; Obituary, 160.

EASTERN manufacturers say that the great investment of capital in the bicycle business is one of the causes of present industrial depression. In the region tributary to Chicago it is estimated that other business lines have lost $112,000,000 by such diversion of trade. Factories formerly devoted to other forms of machinery have changed to wheel manufacture, and purchasers of the potent cycle withhold expenditure in other directions. The cessation of trade in other directions caused by the universal use of the bicycle shows that it to-day exercises a commerical influence second to none in the industrial world.

EXPERIMENTS are being made with dredgers for raising the auriferous gravels from the beds of the Fraser and Quesnelle rivers in British Columbia. People of means are interested, and if the present trials are successful it is expected that considerable will be done in that way. For a number of years dredgers have been used for the same purpose in Georgia with some success, and lately one has been put to work on the fine sandy gravel in the bed of the Little Snake river in Colorado. The dredgers on the Fraser, three in number, cost from $20,000 to $40,000 each, but at last reports would require alterations to give satisfactory results. So far in California the results of dredger work have been uniformly satisfactory. It is a form of mining that requires considerable capital, judgment and careful management to be profitable.

FOREIGN CAPITAL is paying more present attention to California mines. Representatives of Eastern and European capitalists—English, French and German—are coming and going and are taking hold of properties. The French capitalists of Trinity county were the first to make large investments. Others are in Placer county opening up placer drift mines. The Exploration Company of London, backed by the Rothschilds and at the head of which is Hamilton Smith, formerly of the North Bloomfield, has taken hold of the Oneida and has had a number of other properties examined. Edmund Davis, a director of the Anglo-Continental Gold Syndicate of London, has been here some time looking for investments. John Hays Hammond is directing a search for mines in California for the capitalists interested in the Chartered Company. These are but a few of the representatives of big European and Eastern capital who are looking for mines in California, and yet all this interest has come up without any concerted effort on the part of Californians to attract attention. No mining field in the world of such extent has been so little self-advertised as California. This is where Coloradans are ahead of us. They know the value of letting the world know what they have and are not slow in doing it.

County Mineral Exhibits.

One result of the late exposition of Alameda products in Oakland is the establishment of a permanent exhibit similar to that of the State Board of Trade. There are in other parts of the State permanent county agricultural displays. It would be a good plan for the mining counties to emulate these examples. An exhibit at the county seat of each mining county of the minerals produced, with samples from the vein, walls and country rock, showing the formations, maps, geologic as well as topographic, and statistics as to water, timber and other matters of interest to miners, would be of great advantage. Experts and others examining mines in any part of the State are often—in fact, nearly always—handicapped by want of sources of information that should be matter of public record. This is especially true as to maps of the topography of the country and as to the geology. That this is appreciated is shown by the fact that many saloons in the mining towns take advantage of it to turn an honest penny by keeping on hand a cabinet in which are specimens from mines of the district, and not only specimens of the ore, but samples from the walls and country rock, as well as maps. These collections are made not so much for display as for the information of the patrons of the place.

Of course, it would not be necessary or advisable to maintain any elaborate collection, nor one for display to attract the attention or admiration of the casual visitor who knows nothing of mines. No attempt need be made to emulate the admirable work of the State Mining Bureau in this city, which in itself serves as the best argument we can offer in favor of county exhibits.

Exhibits of the character suggested should not cost very much. Space sufficient can be allotted in the county building of each county. Most of the maps necessary could be obtained gratis, and the mine owners would with little solicitation supply the minerals for a creditable start.

The California miner is not a good advertiser, nor is he inclined to ask help from others, but in a case of this kind it seems that it would be to the interest of any one having the welfare of his county at heart to take action for the common good.

Mining Blunders.

According to Professor Ashburner, there were in 1858 over 280 quartz mills in California with 2610 stamps and the total cost of the milling property exceeded $3,000,000. In 1861, while he was attached to the Geological Survey, he made a careful examination of these mills and could find only between 50 and 60 in successful operation. Commenting upon this, the late J. Ross Browne, in his "Mineral Resources of the Pacific States and Territories," published in 1868, gives some of the reasons for these failures, which will apply in a minor degree at the present time. He said: "The greatest common blunder has been that of erecting a mill before the vein was well opened and its capacity to yield a large supply of good rock established. * * * The next blunder was that the difference between a pocket vein and a charge vein was not understood, and the existence of rich specimens was considered proof of a high value of a mine. * * * The next error was that nothing was known of pay chimneys, and if good quartz was found in one place, it was presumed that the whole mine was of the same quality. * * * Much rock has been crushed without examination and without proper selection. * * * Sinking was done often when nothing was found at the surface. * * * It has not been customary to make assays regularly of the tailings, so as to know what was passing off. The mine owners in a large proportion of cases have not resided at the mines and have not made a study of the business."

It is no wonder then that mining was considered little better than gambling and that conservative business men refused to go into it. One indication of great improvement in methods, and a consequent better reputation to the business, is the fact that so many down-town merchants, bankers and others, who a few years ago would refuse to listen to any mining proposition, are now most active in looking for good mining investments, knowing that mining properly conducted is as safe a business as any mercantile business. But there are miners in California yet who would do well to heed the warnings of Ross Browne.

The Geological Survey and Mining.

It is pleasing to note that the United States Geological Survey has at last relinquished its position as scientific coroner to our great country and ceased to employ its time and means in post-mortem examinations, for not only have our federal scientists delighted in voluminous reports upon fossils, but they have until recently exhibited a remarkable reluctance to study a mining district until it had been practically worked out or abandoned. No one can doubt the scientific value of the reports upon the Comstock lode and many others, but every competent mining engineer knows how little practical value they have been.

The geology and mineralogy of one district, except in points of common knowledge among mining men, has but little application to any other district; but a thorough knowledge of the mineralogy and geology of a district, especially in our interior States, is often of great value to operators and good, timely reports of greater value to investors. The time when work is needed is in the early days of a mining camp, and not after it is fully understood by the miners and the public. It is no indication of scientific ability to go into a well-developed or practically exhausted district and collect the fragmentary records and researches of competent men, clothe them with a new vocabulary and evolve a voluminous monograph. Yet by this method too much of our knowledge of mining geology has been accumulated.

What is demanded by the practical investor, engineer or miner is a thoroughly comprehensive report upon existing facts and conditions of geology. Volumes of hypotheses are valuable, but when the facts are so interwoven with these hypotheses as to make their differentiation impossible, the report loses a large part of its value to competent men who are able to decide for themselves the legitimacy of conclusions.

During the past two or three years the change of policy on the part of the Survey has been a matter of gratification. No one wishes the scientific side of the science overlooked, for its advance is of greatest importance; but in the meantime some changes in methods would place in immediate practical use some of the accumulated knowledge.

The timely report upon Cripple Creek district is a marked advance, although by slight effort it might have been before the public six months sooner. Good work has also been done on the Mercur district. The field work in the Nevada City and Grass Valley district was finished in the winter of 1894, but is not yet in evidence. The Cripple Creek report is of great value to conservative men, and, should the demands of the future warrant it, it can be elaborated with the further development of the mines.

Meantime Butte, Montana; Bisbee, Tombstone and Pierce, Arizona; Carlisle, Pinos Altos and Mogollon, New Mexico; Kern and other counties in southern California; Baker City, Oregon, together with the gravels of Idaho, Wyoming and northwestern Colorado, present problems that might be solved with great value by the United States Geological Survey. It will be argued that such work can not be accomplished in a short time and without considerable expenditure of money. But it is to be remembered that competent men are not limited to the corps of the survey, and that reports like that of the Cripple Creek district involve but a few months time and a small expenditure. The Survey now complains of lack of sufficient appropriation, but it is well known that of that part devoted to mining a large proportion is expended in topographic and geologic mapping of such areas as our high Sierras, where the cost of mapping is as great as the value of the land, and where no mines have been developed. The geologic atlas has proved itself a valuable feature, but until the areas of some economic consequence have all been mapped, the work might as well be confined to such localities.

The Geological Survey has never, and probably never will, develop new mineral resources, but it can make the name Government Report synonymous with promptness and comprehensiveness, as well as with truth and conservatism.

Concentrates.

EMPLOYMENT AGENCIES in this city are advertising for miners at $3 per day.

REPORTS continue to come in about the deplorable condition of the miners who went to Cook inlet.

A MINER in the Goler district, Kern Co., purchased a mine for $80 and within three days found a $600 nugget.

GRANT BROS. of Salt Lake, Utah, have 150 men at work on their quartz and placer properties at Granite, Oregon.

"GELIGNITE" differ mainly from dynamite or "giant" in the fact that gelatin is the base instead of infusorial earth.

LEE & LEAVITT of Minneapolis, Minn., have bought the Columbia mine, Baker City, Or., for a price stated to be $90,000, $10,000 down.

AFTER fifteen years of litigation, the Aurora lode claim in Alaska has been disposed of, the Nowell Gold Mining Company becoming the purchaser for $16,825.

DOWNIEVILLE, Sierra county, is soon to be lighted by electricity. The abundance of free water power in the Sierras is certainly a great boon to the towns in this respect.

THE reduction works at the Providence mine, near Nevada City, Cal., were burned last Thursday morning, involving a loss of $10,000. The works will be immediately rebuilt.

DESPITE the intense heat this is the harvest time of the dry placer miners of southern California, who are busy with dry washers, in many places averaging from $2 to $5 per day.

FLAGS were half-masted everywhere through the State of Nevada and in many places in this city last Sunday, the day of the funeral of R. P. Keating, the Comstock superintendent, who died at Virginia, Nev., last week.

A CONTRACT has been let for conveying 360,000 feet of lumber from Gage Hill to the Horse Shoe Bend mine on the middle fork of the American river, to be used in building a flume to carry water from El Dorado canyon to the mine.

THE secretary of the Colorado Mining Exchange says that the gold yield of Cripple Creek district for the first six months of '96 aggregated $7,256,000, and estimates the total production of the year at $15,000,000. The '95 production was over $9,000,000.

IT is again reported that an English syndicate is negotiating for the purchase of the De Lamar mines in Lincoln Co., Nevada. This time H Bratnober is mentioned as the intermediary. These mines the owner is said to have refused $3,000,000 for.

FROM Washington, D. C., comes the statement that Secretary of the Interior Smith has "hung up" all the pending patents of California mineral land to the railroad companies till after the second session of the Fifty-fourth Congress, which convenes next December.

THE Leadville Miners' Union has decided to accept for the district the scale of wages fixed by Judge Owers for the Weldon mine, now in the hands of a receiver. The miners asked $3, but were allowed $2.50 for surface men. It is believed that the strike will soon be over.

IT is said that the gold fever has struck eastern Canada. Stock in new mines in British Columbia placed on the market in Toronto and Montreal is being snapped up eagerly. The cheaper the price of the stock the more easily it is sold. To a miner this would be an objection to the stock.

A SPOKANE COMPANY has been formed to construct and operate a power plant to supply the towns of Rossland and Trail with power to run the mining machinery of those camps. It is proposed to take power from the falls in the Pend d'Oreille river just above its confluence with the Columbia.

FROM Ripsey, Arizona, come reports of two great strikes—one of a vein of sulphurets "six feet wide, assaying $484 a ton," another of a meteor two acres in area, which "came down red and smoking" and burying five people where it struck, forming a hot mound. Both strikes are alleged to have taken place last Sunday.

THE United States tunnel project at Idaho Springs, Colorado, is a proposition to tap a number of the mines of the district. The plans call for a tunnel 3½ miles in length when completed to tap the Crown Point at the depth of 1750 feet, Russell gulch at 1500 feet, Alps mountain at 2500 feet and Quartz hill at 2200 feet.

ON the Rand, South Africa, for the first half of this year the dividends paid by mining companies—twenty-one in all—amounted to £854,851, as against £1,360,232 paid by thirty-two companies in the first half of 1895. The total production was 1,055,000 ounces, valued at about £3,500,000. The dividends, therefore, amounted to nearly 25 per cent of the output.

FABULOUS and mythical "lost diggings" are being found in these busy days of prospecting in connection with newer and mostly better finds. On the upper Clearwater above Pierce City, Idaho, the "lost placer diggings" from which the Indians many years ago drove those of the miners they failed to massacre, have been rediscovered and are now being worked.

IN the mining camps of California there is little talk of hard times and to them is due the credit of having largely decreased the number of unemployed in other parts of the State. No local paper published in the mining sections of the State fails to record the reopening of mines every month and each one of these means the furnishing of work to men out of employment.

SILVER reached the lowest figure for some time this week, when in New York commercial bars sold at 65c. Later they rallied and sold at 65⅝c. Mexican silver dollars also declined, reaching 51c from 53c. Bullion brokers have made special inquiry in London in the matter of future delivery of silver bars and learned that in the last three weeks contracts registered for the future delivery of silver have amounted to only about 60 per cent of what they were at the corresponding time last year.

FROM reports received it is evident that considerable interest is being taken in the coming convention of the California Miners' Association in this city on November 10th. Regarding officers, it is understood that the present honored president, J. H. Neff of Placer county, declines to consider further incumbency of the office of president of the association. In case Mr. Neff should positively refuse to further fill the place he has so long and creditably held, it will be necessary to choose some other practical mining man as head of the organization. It is believed that some such man as Harold T. Power, of Sunny South, Placer Co., would worthily fill the chair.

AN English syndicate proposes a novel scheme for bringing Nevada ores within reach of railroad transportation. It is to widen and deepen the Colorado river from a point in Lincoln county to the Needles and set afloat a fleet of light draft steamers to transport the ore. T. Watkins-Davis of the syndicate has already obtained options on a number of the mines in Lincoln county to be taken up in case the scheme goes through.

TEMPORARILY abandoning the old question, "What does it cost to produce an ounce of silver?" a good many papers are now editorially discussing the question "What does it cost to produce an ounce of gold?" It is as impossible to correctly answer the one as the other. As well ask, "What does it cost to support a family?" It costs $50 per annum or $50,000, according to size and surroundings. One thing, however, is assured, that, taking everything connected therewith into account, every ounce of gold mined costs $20.67 to produce it.

SECTION 181 of the State laws of Colorado provides "that every person who shall mingle or cause to be mingled with any sample of gold or silver-bearing ore any valuable metal or substance whatever that will increase or in any way change the value of said ore, with the intent to deceive, cheat or defraud any person or persons, shall, on conviction thereof, be punished by a fine of not less than $500 nor more than $1000, or by confinement in the penitentiary for a term of not less than one nor more than fourteen years, or by both such fine and imprisonment."

IT is difficult to state exactly the present gold holdings of the banks in the different cities. Just one month ago the comptroller of the currency reported the gold holdings of the prominent banks in fourteen cities of the United States as follows: New York, $48,869,499; Boston, $7,161,128; Philadelphia, $7,440,111; Chicago, $16,836,022; Baltimore, $2,020,270; Washington, $1,238,056; Cincinnati, $1,026,304; Cleveland, $1,586,275; Pittsburg, $3,283,391; Detroit, $1,188,552; Brooklyn, $628,034; Milwaukee, $2,070,680; New Orleans, $594,899; San Francisco, $1,476,502.

THE prospectus of a new British Columbia mining venture which is put upon the London market asks for a capital of £350,000. It is proposed to work the bed of the south fork of the Quesnelles river, about 9¼ miles in length, in the Cariboo district. For this purpose a dam is to be built at an estimated cost of $225,000 to hold back the waters in the Quesnelles lake. An expert claims that he obtained samples of the gravel in the bed of the river that would show $150 to $200 per cubic yard. Of the capital £270,000 is to be paid by the company for the rights granted by the legislature.

THE sale of the Diamond Hill mine, in Montana, for $2,000,000, promises to be a good thing for San Francisco mining machinery men. According to Thomas Ewing of Oakland, who assisted in the deal and will remain as general manager, most of the new machinery will probably be purchased in this city. The Scotchmen who have made the purchase intend to make extensive improvements, including a modern electric plant. The present mill is of 40 stamps, but a new one will be built of a capacity of 600 tons a day. About $250,000 will be expended in improvements.

IT is understood that Prince Poniatowski has succeeded in interesting some of the representatives of large English capital in the California Exploration Company which he organized and which has obtained bonds on a number of mines in Calaveras county. It is said that Percy Tarbutt, who is a director in Cecil Rhodes' Chartered Co. and Edmund Davis, a director in the Anglo-Continental Syndicate of London, depending upon the report of their experts, Edmund W. Jackson of Australia, Percy Tarbutt, Jr. and Richard A. Parker of South Africa have decided to take a large part of the stock in the company and thus supply the means necessary for developing the properties.

IN answer to several similar inquiries this week, it is to be said: Where several locations are held as a mining claim, work done on any one of the locations equaling in amount that which would be required on all of them, if they were separate, is enough to maintain the rights, but the locations must be contiguous, so that each location will in some way be benefited by the work done. Work may be done on the claim itself or on other ground where it has a direct relation and is in reasonable proximity to it. The work must have a direct bearing upon the improvement at working the mine itself. Under this head prospecting for the purpose of discovering ore bodies or pay channels would be included.

AN electric plant is being erected by the General Electric Company for Dr. W. H. Garlick, at Hart, in Shasta county, to supply the Texas Consolidated mine and mill with power and light. Dr. Garlick, who owns the water rights, is preparing to supply other mines and mills in the neighborhood, the whole plan being laid out with a view to extension as required. The plant now being erected is a three-phase alternating, operating at a voltage of 2080. The arrangements are to supply the Texas Consolidated with 60-horse power for the mill and rock breaker and 20 for the winze hoist. Owing to the large amount of free water in Shasta county, it is a good field for the use of electricity for working the mines.

TALKING of miners and prospectors, a mining engineer, who claims to have studied the difference between a prospector and a miner, defines them as follows: "A prospector watches every piece of float and studies its source, knowing that it never came up hill, and he sees things which no one else would ever notice to tell which way the straws are pointed. The minuteness of his detection is marvelous. On the other hand, the miner sees nothing on the surface nor in the formation of the country, and could not even select a nice rich cropping if he should stumble upon it, but when he gets inside of a tunnel he can take out the best ore in the shortest time. His instinct serves him well, but he sees nothing until he gets underground. A good prospector is seldom a good miner and vice versa. The two are opposite and distinct in their lines of action."

A FEW years ago the blue jays and mountain squirrels were contemplating taking possession of the almost abandoned town of Jackson, Amador county. Now few livelier mining towns can be found in the West, and it is no wonder that there is no complaint of hard times by scarcity of money when the following mines paid out for payroll and supplies such sums as these last month: South Eureka, $8000; Oneida, $4000; Kennedy, $20,000; Argonaut, $3500; Alma, $3,000; Anita, $2500; Zeila, $20,000; Bellwether, $2500; Jackson Gate, $1500; Union Consolidated $7,500. Total, $72,500. To this $12,500 more can be added for labor and material at other mines in the neighborhood. Most of these mines are only in process of development and when the Anita, Argonaut, Alma, Jackson Gate and Union Consolidated put up mills, as they probably all will within 18 months, and begin to take out and crush ore the pay roll of the old town of Jackson will be further increased.

SOME individuals propose reprinting the list of California mines and miners in pamphlet form. This paper collected and is publishing these names pro bono publico, did not copyright the matter, and of course now that the valuable information has been published in these columns any one has a right to make such subsequent use of it as he sees fit. It is understood, however, that business men are being solicited for advertisements in connection with the scheme of reproducing the lists. It is fitting to state that this paper has no connection in any way with the proposition. It may be further in order to say that it is difficult to see in what way any business man can possibly be benefited by the appearance of his business card in connection with this warmed-over affair. Doubtless the only ones who will see it are the advertiser himself and a few of his competitors. It cannot reach possible or probable customers, and hence is as worthless as schemes of that nature usually are. It may be added that from week to week, as the list was published herein, a large number of extra sheets, with the different installments thereon, were printed for the use and convenience of those interested, and any one who has not yet secured a set of these lists can have them gratis by applying at this office.

INNUMERABLE inquiries are being received by this paper concerning the correct status of the recent decision of the Supreme Court of the United States as to what is necessary or unnecessary to constitute a sufficient marking on the ground in the making of a mining location. In answer it can be said that at the time the advance sheets of the decision were received there appeared to be an error therein, the use of one word conveying a meaning apparently opposite to that intended by the court. Jno. M. Wright of this city addressed the company publishing the report, pointing out the supposed error, and received answer that that was official and so incorporated in the permanent report. He addressed Judge Whyte, who prepared the decision. Pending Judge Whyte's reply the matter is in abeyance. If, as is likely, a mistake has been made in transcribing the language of the court, the decision is readily understood and in accordance with existing custom and use. If it is officially endorsed and stands as it reads, it virtually announces that no location is necessary, which will hardly be accepted as law, even though it comes from the highest legal tribunal on earth. On July 28th, in the case of Howeth vs. Sullenger, the Supreme Court of this State rendered a decision on virtually the same subject, a syllabus of which appeared in "Concentrates" in the issue of the 1st inst.

CALIFORNIAN and American civil and mining engineers usually estimate very closely on the cost of work, and rarely is the estimated cost greatly augmented. That this accuracy is not universally shared is shown by experience. The estimated cost of the Manchester, England, ship canal was $28-750,000. Nearly $80,000,000 was spent before the canal was completed. An international commission reported in 1856 that the cost of digging the Suez canal would certainly not exceed $40,000,000. It cost $94,500,000 beside Egypt's gratuitous building of light-houses, dredging of the harbors, advance of money without interest, and gift of forced labor, the whole amounting to $20,000,000 more. Engineers spent a year collecting data for their report on the Congo railroad, which they asserted could be built for $5,000,000. They now say that the total cost will be $12,000,000. The notorious underestimate of the cost of the Panama canal nearly swamped that enterprise before wholesale stealing completed the ruin. The forts on the Meuse river, estimated at $4,500,000, cost $16,-000,000; the Corinth canal cost $12,000,000 instead of the estimated $6,000,000; a harbor and a railroad on the island of Reunion cost $13,500,000 instead of $6,800,000; the Senegal railroad, which was to be completed for $2,600,000, absorbed $9,000,000, and the Langson railroad in Tonkin, which was to open a conquered province for an expenditure of $500,000, cost the French treasury $4,367,790.

THE salaried officials of the Anti-Debris Association must do something to show for their wages, even if some of their supporters go hungry in want of a market for their produce. Tons of fruit and vegetables are dumped in the bay in this city in want of a market; the miners with ready money are the farmers' best customers; but that cuts no figure with the Anti-Debris Association, who would if they could cut off such a source of revenue to their constituents. The latest case is reported from the Forest Home mine, shut down under a temporary injunction secured by the association. The alleged facts are that early this year Los Angeles men spent several thousand dollars laying two miles of 18-inch steel pipe and building a hydraulic plant believed to meet all the requirements of law. A restraining solid stone impounding dam was built and accepted by the Debris Commission and a permit granted. The mine was worked with 250 inches, dropped into the Arkansaw creek ten miles from where it empties into the Cosumnes river. During the summer months this creek is dry, its course running through a large reservoir or lagoon and numerous stretches of willow thickets or marshes. With the settling in the impounding dam and the lagoon and the straining through miles of willow flats, it is considered impossible for material which could be of any appreciable damage to the river to ever reach it. In the bed of this creek and adjoining it are gravel deposits and rich placers. The farmers along the ten-mile stretch of the creek entirely agree with the miners, who claim that the law has been strictly complied with and that no damage has been done to the creek or river. The officer who served the injunction found it entirely free from deposits of tailings or even the lighter sands. The work is stopped. The whole section is as dull and devoid of money as though there was not an ounce of gold within 1000 miles of it, but the anti-debris officials, disdainful of the appeals of miners and farmers alike, who agree as to the commercial value of the work, continue to draw their salaries, paid in part by these people, and doubtless can stand it as long as anyone else.

Vein Walls.*

By T. A. RICKARD, State Geologist of Colorado.

(Condensed.)

From time immemorial the fissure vein has been held the simplest type of ore deposit. The prominence given to it by Cotta and his disciples, from their study of the mines of the *Eerzgebirge*, is impressed upon technical literature; and, in consequence, the ores which carry the valuable metals have been supposed to occur mainly in fissures, cleaving the rocks in diverse directions, and the noblest type of vein has been deemed that which cut across the country independent of its structure, whether evidenced as bedding, foliation or cleavage, and which was identified with rents produced in the rocky crust of the earth.

As so conceived the vein was a fissure filled with ore, extending through the country for a varying distance, and continuing downward to a depth more or less proportionate to its londitudinal extent. The vein material was bounded by an encasement of rock, and those immediate surfaces which limited it on either side were called "walls."

These primary conceptions have been modified by the experience of modern mining in widely separated regions. The study of lode formations has led to the recognition of notable departures from the supposed normal structure of the veins of Saxony and Cornwall, the two classic homes of early economic geology.

Typically the walls of a vein are conceived as parallel rock planes enclosing the ore, the upper one being called the "hanging" and the lower the "foot wall."

Walls are rarely alike. Even where a vein traverses a homogeneous formation, such as a massive crystalline rock, it is usually found that the surface which bounds it underneath differs from that which limits it overhead. This is to be ascribed to the effect of the agencies which brought about the deposition of the ore. The action of underground waters tends at first to affect both equally; but in many cases probably the solutions, as they slowly ascend along the line of fissuring, are prevented from penetrating into the encasing rock by the occurrence of an impermeable covering of clay, due to abrasion, which may line either wall, but, because of gravity, generally accompanies the under one. Similarly we are justified in supposing that the deposition of a mineral deposit may form a coating which would serve to protect the foot wall from the corroding effects of chemical action. The activity of the mineral bearing current thus becomes diverted in its greatest intensity toward the upper wall, where the decomposition of the rock surface may be followed by its disintegration so as to cause the exposure of fresh faces for further dissolution.

When a vein occurs in a formation composed of several kinds of rock it may cut across the lines of parting and be labeled a "true fissure;" or it may conform to them, and become a "bedded vein," if the two beds happen to be similar, or a "contact vein," if they are dissimilar. It is evident that, when a vein crosses the bedding of a series of sedimentary rocks, the differences between the enclosing walls at any given place will depend upon the thickness of the beds traversed, and the extent of the faulting of the country along the line of the fissure. When the faulting is slight the change in the wall rock will be practically simultaneous for both sides of the vein; while, when the dislocation is equal to, or exceeds, the thickness of the members of a series of dissimilar beds so intersected, the opposing walls may be entirely dissimilar.

Many veins follow the contact between the eruptive dikes and the metamorphic or sedimentary formations which they have penetrated. The dikes of quartz-andesite porphyry traversing the granitoid gneiss of the earliest mining districts of Colorado (in Boulder, Gilpin and Clear Creek counties) offer many examples of this type of vein structure. In such cases the mineralization may often be found to have spent itself on the more soluble porphyritic igneous rock, rather than upon the less soluble metamorphic. The walls of such veins will vary as the ore deposition has followed either fractures along the immediate contact, or those which ramify into the body of the dike, or those again which cut across the latter, where its irregular outline has been an obstacle to the main line of figuring.

In descriptions of lode structures mention has been made of the occurrence of clay selvage, following sometimes one, sometimes both, of the walls of a vein. This "clay" may occasionally be material precipitated from solution; ordinarily it is only crushed rock. It frequently encloses exquisite mineral specimens, because its soft consistency has permitted untrammeled crystalline growth. Most examples of well-developed crystals of native gold have been discovered under such conditions. This is the case at Cripple Creek, Col., where the gouge or clay has been dried and hardened near the surface, and as a crumbly earth, made purple by the presence of fluorite, carries beautiful crystals of gold pseudomorphic after sylvanite and calaverite. The exquisite leaf-gold specimens, for which Farncomb hill (Breckenridge, Summit county, Col.,) is so famous, are found embedded in talcose clay. Large pieces of pure argentine are often found in such an environment, as at the De Lamar mine in Owyhee county, Idaho. Wire silver also has been found in comparatively large amount encased in such a "mud" in many Leadville mines, notably at the Crown Point in 1886.

By reason of their opposition to the passage of water such seams of clay protect the rock surface of vein walls, and underneath them there will occasionally be found comparatively fresh and unaltered rock having beautifully polished faces or slickensides. At Ballarat, in Australia, I have seen many such rock faces like finished ivory in their smoothness, and streaked with black lines, due to the grinding of specks of pyrite. In the Bonanza mine, Baker county, Or., there could be seen quite recently an exquisite example of such an occurrence. In an upper drift there was at one place a surface of a few feet square (on one of the walls a gold-bearing quartz vein) covered by a thin layer of black clay, under which lay what seemed a white enamel of very remarkable delicacy. It could not be removed without breaking, because it was very friable, consisting essentially of crushed quartz partially recemented, probably by pressure.

"The handwriting on the wall" is not always easy to decipher. The lines or striæ occasionally to be seen upon its surface have been held to indicate the direction of that movement (or succession of movements) of the opposing rock planes to which the deposit of ore primarily owed the opportunity for its existence. These lines, however, sometimes have opposite directions within a short distance and offer conflicting evidence hard to explain.

Rarely is a story told more clearly than in the ripple-marked foot wall which was to be seen in October, 1891, in the Johnson's mine at Bendigo. It had been very difficult to distinguish the bedding of the country because the development of a strongly marked cleavage had obliterated the lines of original sedimentation. At the 1065-foot level, however, the matter was made plain. For more than 100 feet square the surface of the foot wall was covered with ripple markings. The crests of the waves were about 3 inches apart and presented all the little irregularities to be seen to-day when the wind blows over the shallow waters of an estuary and imprints the evidence of its action upon the yielding sand. The markings had been protected by layers of Silurian sediment, and the whole series had been indurated into rock, the sand which bore the markings becoming quartzitic sandstone, and the overlying mud slate. Between them, as within the pages of a book, was preserved the conclusive evidence of the original position of the beds of rock enclosing the reef, which had been formed in later times, when fissuring had made room for the circulation of underground waters and the deposition of the gold-bearing quartz.

In the above interesting case the corrugation of the foot wall, due to the ripple markings, rendered difficult the detachment of the ore. Distinct walls, especially when accompanied by selvage, are very useful in actual mining; but they are not by any means necessarily indicative of a productive vein, or particularly favorable to the continuity of the ore. A "clean" wall and a good "gouge" are welcomed by the miner because they ease his toil; but the idea that their presence alongside a lode gives it a character better than another unprovided with such adjuncts is a dangerous delusion. In many mines more ore has been lost through the persistent following of a "wall," without exploring beyond it, than was ever compensated for by the greater facility given by such a parting plane for the breaking of the ore found.

Many veins have no defined walls, but gradate imperceptibly into the enclosing country, and are bounded only by the commercial value of the material mined. Such veins are to be seen, for instance, in the mountains that overlook Silver Plume, Clear Creek county, Col. In the 300-foot level of the Seven-Thirty mine a fracture penetrating the metamorphic granite carries ore on both sides, which diminishes in richness as it spreads into the encasing country. The joints in the granite are evident.

In this mine the so-called "walls" are often simply two parallel veins (rich, but very small), separated by clean, hard country. On the same level further east the granitoid gneiss is traversed by two streaks of ore, of which one is much the richer. Between them there are at least two well-marked parallel fractures devoid of ore. The poorer vein has a thin selvage, under which there is a streak of quartz carrying a little silver ore; but the companion vein follows a fracture, unaccompanied by any selvage, whose upper side is impregnated with about 3 inches of tetrahedrite, galena and polybasite.

(To be Continued.)

*Trans. Am. Inst. M. E., February, '96, meeting.

The Accumulation of Amalgam on Copper Plates.*

Communications in discussion of the paper of MR. R. T. BAYLISS, presented at the Pittsburg meeting, February, 1896.

L. D. Godshall, Everett, Washington: This very interesting paper cannot fail to command the attention of every one who has ever had experience in the amalgamation of gold ores. I wish to call attention to three very important facts brought out very prominently by the paper, namely:

1. The extent of accumulation of amalgam on copper plates in the form of scale, not removable in the ordinary manner.

2. The change in the relative quantity of the two metals in the amalgam as we recede from the battery discharge.

3. The difference in fineness of the bullion obtained from the above-mentioned scale as compared with the bullion from the daily cleanups.

From Mr. Bayliss' figures we find that during the life of the plate in question 14,942 tons of ore were crushed, yielding amalgam of the value of $5.03 per ton, or a total value of $75,158.26. The amalgam accumulating on the plate during this time as scale we find to have had a value of $8340.54, or $0.558 per ton of ore treated, representing 11.09 per cent of the total amount of amalgam saved in the ordinary cleanup; or, taking the amalgam saved by daily cleanup plus the amalgam scale as representing the total saved on this plate, or 100 per cent, we find that the daily cleanup saved 90.01 per cent, while the scale represented 9.99 per cent. The above figures do not include some additional amalgam still adhering to the plate after scale had been removed.

We are told that this was not an exceptional case at the Drum Lummon, but that other plates have even yielded a third more than the one in question. The interesting query now comes up whether this experience at the Drum Lummon is exceptional or universal at all mills; and another question arises as to how long such an accumulation might continue, and at what rate. It is to be hoped that the experience of others may be given, in order to throw additional light on this subject.

The difference in composition of the scale and ordinary amalgam is very interesting. Tabulating the results given by Mr. Bayliss, we obtain the following:

AVERAGE FINENESS OF BULLION OBTAINED FROM:

	Amalgam of Daily Cleanup.	Scale.	Amalgam from Copper Plates of Frue Vanners.
Au.	541.5	431.4	380.5
Ag.	443.9	562.5	602.0
Totals	985.4	993.9	982.5

The above shows conclusively what Mr. Bayliss claims, "that the gold fineness of bullion is highest nearest to the battery, and gives place to a steadily increasing silver fineness as the amalgam is deposited upon the copper plates at greater distance from the battery discharge."

With reference to fact No. 2, there is no doubt in my mind that the change in the composition of the amalgam as we recede from the battery discharge is caused by a difference in the tendency of the gold and silver to amalgamate, the former amalgamating more easily than the latter, and therefore more quickly, and hence being found nearer to the battery discharge.

Fact No. 3, however, is not so easily explained. In the first place, we must assume some cause for the formation of the scale. Let us call this the affinity of the amalgamated gold and silver for the amalgamated surface. I use the term "amalgamated" gold and silver, as it is evident that the gold and silver must pass through the form of amalgam before becoming scale; the next assumption, then, naturally follows that the cause of the phenomenon is a greater affinity of silver for the amalgamated (or scale-forming) surface than of gold.

Mr. Bayliss, referring to native silver in the ore, claims that the facts in the case disprove the theory which ascribes the results to such native silver. He does not, however, take into consideration that the condition of the native silver in the ore may be very different, or its behavior very different, from that of the same silver after amalgamation. In that distinction, to my mind, lies the solution to the problem.

*Trans Am. Inst. M. E.

(To be Continued.)

Mechanical Progress.

A New Construction for Fly Wheel.

The first part of the following article was furnished for the MINING AND SCIENTIFIC PRESS by Mr. A. P. Brayton, the second part by Mr. Edward S. Cobb. The accompanying illustration was engraved expressly for this article.

The North Star Power Plant.—The paper read by Mr. Arthur de Wint Foote, C. E., at the meeting of the American Society of Civil Engineers, recently convened in San Francisco, elicited much interest and no small amount of discussion.

The paper referred to makes a very elaborate and exhaustive report upon the operation of the compressed air transmission plant at the North Star mine in Grass Valley, Cal., a brief description of which, compiled from this report, we here present.

The power station consists of a Pelton wheel 18 feet 6 inches in diameter, attached to the shaft of a Rix duplex air compressor, compound tandem type. The initial cylinders are 18 inches and the second cylinder 10 inches diameter, with a 24-inch stroke.

The wheel is built up of angle iron plates riveted together to break joints, and is held concentric with the shaft with twelve pairs of radial spokes of 1¼-inch rod iron secured by nuts to the cast iron hub. The driving force, being applied to the rim, is transferred to the hub by four pairs of 2-inch iron rods so arranged as to form a truss.

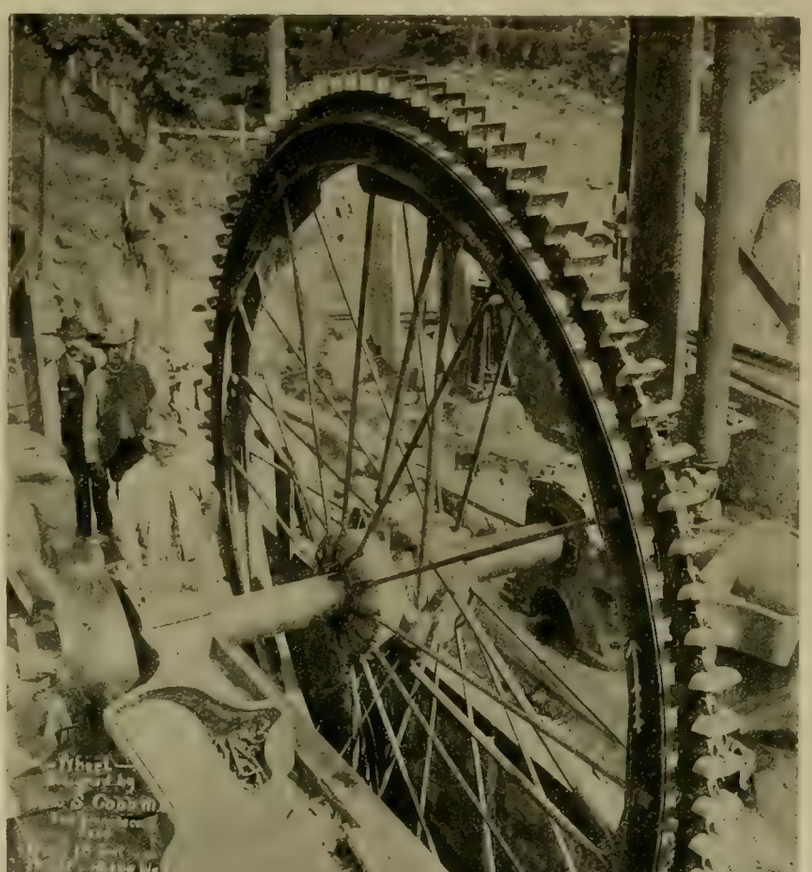
The wheel weighs 10,500 pounds and runs at 110 revolutions under 750 feet head, developing upwards of 300 H. P. It is made of this large diameter for the purpose of giving the proper speed to the compressor under the high head available. The water is applied to the wheel through a variable nozzle controlled by a hydraulic regulator, which maintains a uniform speed on the wheel with a variation from full load down to 25% of same—making its operation absolutely automatic as well as economizing the water supply—no more being used at any time than required or the work.

The wheel was made from designs furnished by Mr. Edward S. Cobb of this city, and the construction, as will be seen, forms an ingenious mechanical combination, altogether novel and without precedent, affording an ample factor of safety with a very high peripheral velocity. The water supply is brought to the wheel through two and one-half miles of 22-inch riveted pipe, affording sufficient capacity to develop 800 H. P. A 3-inch lap-weld pipe conveys the air at a pressure of 90 pounds from the power house to the company's shaft, 800 feet distant and 125 feet elevation. This is at present running a 100 H. P. pneumatic hoisting engine and a 75 H. P. compound pump, besides other pumps, drills, forges, etc.

The report above referred to shows that repeated tests on this wheel made by the most approved methods, and checked up very closely, give the remarkable efficiency of 93% at full load, also an average efficiency of something over 90% for quarter, half, three-quarter and full loads. The suggestion has been made that the extraordinary efficiency here shown is accounted for in part by its unusual dimensions. This, however, is incorrect, as equally high efficiencies have been obtained on Pelton wheels of much less than one-third this diameter.

The efficiency of compression and transmission from water wheel to motors, not including cost of reheating, is given as 73%, making a most favorable showing for the plant as a whole under the conditions here installed.

A New Construction for Fly Wheels.—The novel construction of wheel mentioned in the above article and here illustrated presents some interesting features to the engineer. At the present time the demand for high peripheral speeds is imperative in many electrical installations, and are often maintained by the use of small fly or band wheels on motors of high revolution, such as the so-called high-speed engine. However, for economy of fuel consumption, reliability of action, steadiness of motion and freedom from excessive wear, the well known Corliss type of engine has no superior. The prime objections to its use at speeds much above 70 revolutions per minute have been: first, the special form of valve gear used, and, second, the fact that large fly wheels, as usually constructed, have not been found safe at peripheral speed much over 5000 feet per minute. The first of these objections has been overcome, and we find to-day engines of the Corliss type running successfully at 135 revolutions per minute. The second objection would seem to have been overcome, if such a construction for fly wheels was used as that herewith illustrated.



Many forms of construction have been proposed for large wheels at high rotative speeds—such as wheels built up on plate webs or discs; wheels with the rims made of small segments of plates laid up in overlapping layers and rivetted; wheels made by winding wire in suitably-shaped recesses to form the rim; and, lastly, the more common form of built-up cast iron wheel. Some attempt has been made to construct large band wheels of wood, and in special cases with success. The excessive cost of large wheels when made on these forms has prohibited their general use, and, in consequence, we find comparatively few engines of the slow-speed type operating where high peripheral speed of drive wheel is needed.

The construction shown in the illustration offers many elements of advantage over those heretofore suggested. All parts, except the hub, can be constructed of rolled steel of sections of common manufacture and of known tensile strength. The rim, while it can be made up in any number of pieces, can have a strength at net cross section, which can be predetermined with accuracy for any required speed of revolution.

Every stress, acting to destroy a wheel when conveying power or acting as a balance wheel, can be accurately determined, and with this construction every such stress can be accurately provided for by material of known strength in form, adapted to simple construction. The calculations for stresses acting in the wheel illustrated show that the centrifugal force, when running at 110 revolutions per minute, produces a tensile strain in the metal of the rim alone of less than 1500 lbs. per square inch of net cross section.

Practically these wheels are simple to construct, and for wheels of large size are doubtless the cheapest so far proposed, as is shown by the fact that such wheels can be made, ready for operation, on this coast at a price of about eight cents per pound of the size and weight here illustrated—larger wheels become cheaper per pound—and they have the great advantage of known strength and stability not attainable in the best built-up wheel of cast iron of far more expensive construction.

THE cause of pitting and corrosion, says J. F. Walliker, has been discussed in every society taking an interest in boiler deterioration, but it is now a matter of universal knowledge that its harmful effects can be entirely obviated by cleanliness and care, and (or) by the use of zinc and common soda. These are applied under various patent designations, but the resultant is the same in lasting benefit to the boiler.

The almost entire disuse of oils to the pistons and valves of engines has materially contributed to the present good order of the interiors, and it cannot be too much emphasized how well the modern engine runs under these conditions. It has been claimed as a factor in the success of the water-tube boiler that the cylinders and valves of the engines are run without oil; but this system of only using the small portions passed in from the piston and other rods has long prevailed in many of our best cargo boats.

Scientific Progress.

ONE of the most singular changes which is taking place in the manufacturing industry is the giving up of the chimney to produce draught. When one looks down upon a large city and sees the immense number of chimneys, through each of which is ascending a cloud of smoke, and realizes that in these numerous clouds of smoke are contained valuable products such as benzole, ammonia and the bases of the artificial dyes, disinfectants, medicines and perfumes, one cannot but wonder that some enterprising manufacturer does not contract for the smoke of a great city. In this age of concentration, when it is so easy to see that it is much cheaper to produce a thousand horse-power with a single engine than to produce it with one hundred and one little engines, it is strange that more attention has not been paid to the systematic collection of furnace gases. Of course, it is easy to understand that the chimney offers a simple and efficient means of making the requisite draught for the fire. In one of the large works of England chimneys have been given up and a definite vacuum is held upon all fires. In this way the products of combustion and destructive distillation which result from the burning of coal and carbonaceous matter are collected, cooled, condensed and worked up. The amount of money and valuable substances wasted through the combustion of coal is immense. The problem is not so difficult as it may seem, for the production of a vacuum on the rear side of the fire, or the maintenance of air-pressure on the front side of the fire, are not either mechanically impossible or are they outlawed by cost. One of the methods which is attracting attention in Germany consists in sucking the gases of the furnaces away and allowing them to pass through water in the form of small bubbles, which removes the soot and some of the products of combustion. The gases are then lead to a gasometer from which they are drawn in the processes of utilization. A manufacture of this kind could easily extend pipes in any direction and draw the gases of combustion from other manufacturers. Aside from the value of the products thus obtained the purification of the atmosphere would be a very important result.

TO PREVENT the chemical action of acids and other corrosive liquids on metal containers and conduits and the like, C. A. Jansen places the metallic container in an electric circuit of like polarity and forms the other pole of a chemically indifferent electrode, which is immersed in the liquid in the vessel. The regulation of the current intensity requires special care. As the corrosion of linings in certain chemical operations is not only troublesome but costly, the invention may be of considerable value. It depends on the fact that when two substances act upon one another the chemical action depends upon the electrical tension between them. To protect the cellulose boilers in which the acid-resisting lining is frequently corroded one pole of a dynamo is connected to the shell of the boiler and a suitably supported axial

electrode which is insulated inside the boiler is connected to the other pole.

A MAGNET whose poles adapt themselves to the irregular surface of a piece of iron to be lifted has been recently invented. It consists of a bar of iron, around which are a number of iron rings or collars fitting it closely, between which are placed the coils encircling the iron bar, the current being such as to make alternate poles of the successive rings. The bar is lifted horizontally, and in the lower part of each of the rings there is a short, thick, iron cylinder which has a limited vertical movement; these iron cylinders will project more or less beyond the lower edge of the rings, so as to adapt themselves to an irregular surface of a piece to be lifted.

Electrical Progress.

Latest Development in Electric Motors.

Written for the MINING AND SCIENTIFIC PRESS by ORRIN E. DUNLAP.

The Buffalo & Niagara Falls Electric Light and Power Company probably has the greatest amount of electric energy at its command of any similar concern in the world.

This company became the successor of the Brush Electric Light and Power Company in the fall of 1893. Their plant was then located on the canal basin of the Niagara Falls Hydraulic Power and Manufacturing Company. In the summer of '94 the present station was built. The dynamo room contains two 300 H. P. motors made by the Westinghouse Electric and Manufacturing Company of Pittsburg, Pa. These machines show the latest and most modern development in electric motors. On the front page of this issue appear six engravings made especially for this article from photographs taken at the Niagara Falls station last week. Plate No. 1 gives an excellent idea of one of the motors, while plate No. 2 shows one of them in the station. The motors are of the self-starting induction type, designed to operate at a speed of 500 revolutions per minute when supplied with current of 3000 alternations per minute and 2000 volts pressure. The core is 36 inches in diameter and 14 inches long inside the end plates. It is built of laminated steel; each disc is punched with 120 slots around its periphery, and these discs, when superimposed one upon another, form longitudinal grooves, into which the conductors are placed. As will be seen by the illustration, the core contains five ventilating ducts, $\frac{3}{8}$ of and inch wide. The conductors consist of machine-wound coils, separately insulated with fuller-boards and mica. The winding is tapped at suitable points and the leads pass through the shafts to the rings, which receive the current from the brushes.

In plate No. 3 is displayed the stationary secondary, which is also built up of slotted steel discs. Each slot contains one rectangular copper conductor, and all the conductors are secured to an iron ring on each side of the machine. Outside the iron rings are two copper rings, each carrying 82 small copper brushes, one for each conductor. The copper rings are rotated so as to either connect or disconnect the brushes and the conductors, as is explained further on. Plate No. 4 shows that the two elements are mounted in a cast-iron frame. The machine is started as follows: The copper brushes mentioned above being disconnected from the conductors in the secondary, the switch through which current is supplied to the collector rings is closed and the motor starts. As soon as a fair speed is attained one side of the secondary is short circuited through the copper ring by connecting the copper brushes with the secondary conductors. This is accomplished by means of a ratchet movement and the handle shown in the illustration. Then the other side of the secondary is short circuited in the same manner. The object of the short-circuiting device is to limit the flow of current when starting. The iron ring, being of comparatively high resistance, prevents the induction of very large currents in the secondary, which, when the primary is at rest, acts precisely as the secondary of a transformer, and therefore if the secondary conductors were short circuited by the copper rings when the switch was thrown in, the primary current would be excessive.

Still another novel feature of this station is that the company buy as well as sell current, their purchases including both alternating and direct current. The force used to operate the Westinghouse motors is of the two-phase alternating class and flows to the station over four cables, each about one inch in diameter, laid in a tile conduit about eight feet underground. As it extends along Buffalo avenue the conduit is composed of eight 3-inch tile, to provide for other cables as the future may demand, but on the company's land the conduit is formed of one 8-inch tile, in which the cables are laid. The cables enter the lighting station on the east side and immediately after passing the wall are brought to the surface and extend up the wall, across the ceiling through a second wall into the dynamo room, where they descend to the switchboard shown in plate No. 5. This switchboard has recording meters for the kilowatt hours and is in direct connection with the power house of the Niagara Falls Power Company. It controls the current supplied to the 300 H. P. motors.

Besides the current used for operating these motors the company buys direct current from the Niagara Falls Power Company, which they distribute to planing mills, machine shops, hotels, stores and small factories for running motors. This current passes through the rotaries in the Niagara Falls Power Company's power house and is taken from the street railway feeders.

The dynamo room of this plant has undergone quite a few changes of late through the installation of the Westinghouse motors and the discarding of old light machines to make room for four new 100-light Brush 5000-volt machines. These Brush machines are of the open-coil variety, built on the general lines of the old type designed by Mr. Brush in 1877 and 1878. However, instead of being two-pole, these later machines are four-pole, having twenty-four bobbins on the armature, the armature being connected in a manner permitting the use of two brushes instead of four to a ring. The machine has twelve shaft wires, four bobbins being connected in series to two segments. The commutator is composed of three rings, each ring having eight segments. The commutator body is of iron, surrounded by insulating material covered with mica. Thus it is impossible for any portion of the commutator to become charred unless the mica is destroyed. The body of the armature is built up on a solid cast ring. The field spools are eight in number and placed over the steel magnets in the ordinary manner.

Electrical Conductivity of Aluminum.

Profs. Richards and Scott have made a test which shows the following as the electrical conductivity of aluminum:

SAMPLE.	Ohms per 1,000 ft. 0lin. diam. at 15° C.	Per cent conductivity at 25° C.	Pr. ct. variation per ° between 15° C and 80° C.
Copper	101.83	100.00	.388
Aluminum—			
No. 1, 99½ pr. ct.	161.40	63.90	.385
No. 2, 99 pr. ct.	163.80	62.17	.385
No. 3, 98 pr. ct.	181.30	56.17	.380
No. 4	174.10	58.48	.361
No. 5	185.10	55.01	.359

A French test lately showed commercially pure aluminum to have a conductivity, taking copper at 100, of 62 per cent.

THE wonders of Professor Rontgen's discovery have given great potency to the term X-ray in small places, where the people generally have little opportunity to see experiments or to gain an understanding of the strange radiance. A Lewiston, Me., dentist promises patients that tooth-filling won't hurt any more, since he has invented a "sort of X-ray process," by which an electric tric current is sent through the tooth continuously for a quarter of an hour before an operation, the electricity "carrying with it a cocaine injection, or, at least, its effects."

Practical Information.

Tempering Steel.

Many an amateur blacksmith, and, indeed, not a few professionals, are unable to temper steel properly, especially for such implements as mill picks and rock drills. To do this is easy enough, provided one knows how. The most important point is not to overheat. If cast steel is made white hot, it is spoiled; yet if a person takes a chisel, mill pick or other pointed tool to be repaired, the smith pushes it into the fire. The point is white hot. They will now put it in and out of the fire a few times, and at last bring it out red hot and work it. Of course, it is already spoiled, and, no matter how low it is tempered, it is next to useless. Take one to the smith and see that he puts the body of the tool in the fire, leaving the two thin edges uncovered till the middle is red hot. As soon as the middle is red hot, pull back and let the thin end just get a dull red heat. It must now be hammered edgeways first, and flatways last of all. It is best to hammer it on the flat part of the anvil, as drawing steel on the edge of the anvil, although a great deal quicker, makes it short in the grain and always causes the tool to break in the thinnest place. Serve the other end the same, only repeat as soon as it loses its dull-red color. The lighter the blows in working steel, the tougher it is. The point should be quite as thin as a fitter's chipping tool, only a little longer; then it will not require doing up so often. When the ends are drawn out the middle will have lost its red heat. The ends can now be filed a little. Now to temper them. Heat them in the flame of the fire, using great care. When a very dull-red heat, cool in rain water with the chill taken off, about three-fourths of an inch from the end, and let down to a blue. If it should be too brittle, a little lower. Serve the other end the same. Cool all over. Grind the edge rather blunt, and for the first few blows hit as light as possible. The secret is in working it at as possible; only keep on repeating very often, and to hit it edgeways as little as possible, but flatways as much as you like.—Blacksmith.

A COMPOUND ENGINE may have a slide-valve or other valve motion. Whether with or without slide valves, the method of starting is essentially the same. A compound engine has two or more cylinders to utilize the steam. The first cylinder receives the steam from the boiler; this first cylinder is a high-pressure cylinder; from this, after performing a certain amount of duty, the steam exhausts into a receiver, from which the second cylinder takes the steam; or, the steam may exhaust from the high pressure cylinder into the steam pipe of a low pressure cylinder. Where there is a second low pressure cylinder, the engine is styled a triple expansion engine. In the simple engine the steam, whatever the pressure used, exerts its force in only one cylinder, and exhausts directly into the air. In a condensing engine, instead of being exhausted into the atmosphere, the steam is condensed, forming a practical vacuum on one side of the piston. In a compound condensing engine the steam is first used in a high pressure cylinder, taking it from the boiler, then in one or two low pressure cylinders, then condensed, forming a vacuum on the exhaust side of the piston. The salient points of the Corliss engine (which is one of that class where the connection between the eccentric rod is broken to let the valve close quickly and effect the cut-off) are the trip mechanism for releasing the valve; its connection with the governor; the dash pot, or device for closing the valve without jar; the wrist motion, reducing the motion of the valve after opening the steam port. In the ordinary steam engine the steam is admitted to and released from each end of the steam cylinder by a valve actuated by the engine itself. The plain, hollowed slide valve is the simplest and commonest form. The earliest point at which it can cut off steam without choking the exhaust is about two-thirds of the stroke; so that for economy's sake in high pressure engines, or vacuum condensing engines, a different method is commonly used.

Silver and Gold Holdings.

The following is an estimate of gold and silver holdings of leading banks of the world:

	Gold.	*Silver.*
German Reichs Bank	$145,500,000	$70,000,000
Other German banks	19,400,000	1,000,000
German Imperial war fund.	30,000,000	.....
Bank of England	284,400 000	8,000,000
Other English banks	40,000,000	.....
Scotch banks	21,800,000	4,000,000
Irish banks	14,000,000	2,000,000
Austro-Hungarian Bank	114 000,000	54,000,000
Austro-Hungarian treasury	81,400,000	.....
Bank of Italy	60,600,000	11,000,000
Bank of Naples	21,200,000	2,000,000
Bank of Sicily	7,000,000	400,000
Treasury of Italy	17,400,000	2,200,000
National Bank of Belgium.	16,600,000	2,600,000
National Bank of Greece	400,000	.....
National Bank of Roumania	11,800,000	1,000,000
Bank of Spain	42,000,000	56,800,000
Bank of Holland	15,200,000	35,000,000
Bank of Algiers	3,200,000	3,200,000
Bank of Portugal	5,400,000	9,400,000
Bank of Sweden	6,800,000	800,000
Bank of Norway	6,600,000	.....
Bank of Denmark	18,600,000	.....
Bank of Servia	1,200,000	1,000,000
Bank of Bulgaria	200,000	400,000
Bank of Finland	4,400,000	600,000
Swedish banks	2,200,000	800,000
Swiss banks	17,200,000	1,600,000
Bank of Russia	454,400,000	5,200,000
Imperial Treasury of Russia	68,200,000	.....
National banks of New York	62,000,000	.....
National banks of United States outside of New York	85,200,000	13,600,000
Treasury of the United States	100,000,000	532,400,000
Australian banks	100,000,000	.....
Totals	$2,234,600,000	$1,074,400,000

Recent California Mining Incorporations.

Berry Creek G. M. Co., S. F.; H. H. Lee, W. B. Lee, F. C. Gehricke, J. D. Drake, S. F.; J. C. Diamond, Butte County; capital stock $1,000,000, all subscribed.

Gold Bank Mining Co., S. F.; S. P. Stow, Goleta, V. and N. Stow, S. F., W. W. Stow, Jr., Santa Maria, H. P. Stow, Forbestown; capital stock $1,000,000, all subscribed.

Minaret Gold, Silver and Mining Co., Fresno; C. J. Beck, Neals, W. J. Tinnin, T. E. Hughes, C. Kershey, M. P. Miner, Fresno; capital stock $500,000, $400,000 subscribed.

Montezuma Mining and Milling Co., Los Angeles; W. E. and B. M. Howard, S. H. and P. L. Griffin, J. H. Huron, Los Angeles; capital stock $100,000, $65,000 subscribed.

Commercial Paragraphs.

BROWN & ZIMMERMAN have purchased a No. 6 Smith mill, eighteen tons capacity, to go to Red Rock mining district, Cal.

ON August 18th the Baker Iron Works of Los Angeles shipped to F. E. Slutman, Waterman Station, one 2-stamp mill, with engine and boiler; complete weight 900 pounds.

THE Truax Car Company, Denver, Col., report having shipped 24 of their ore cars to Guggenheim's smelter, in Mexico, 4 to A. M. Holter, Helena, Mont., and 5 to the Isabella Mining Company, Cripple Creek, Col.

THE Treasury Department announces that from official information from twenty-one countries it is learned that the coinage of silver during the calendar year 1895 amounted to $113,672,000. Of this sum $13,603,200 was recoinage. Deducting this from the total coinage gives the coinage of silver from new bullion as $100,069,000. The country coining the largest amount was Mexico, with $24,832,350, followed by Japan, with $23,883,500; China, $8,233,340; Spain, $7,969,000; Great Britain, $5,821,151; United States, $5,698,000; Austro-Hungary, $5,299,000; Peru, $4,073,000; Russia, $3,554,000; Ecuador, $2,500,000; Germany, $1,826,000. The silver coinage by Great Britain during the year for her colonies was $3,808,130. France coined for Indo-China $6,092,000 and for Morocco $354,600. From January 1st to August 1st, 1895, the coinage of silver dollars by the mints of the United States was $8,562,412. The world's product of silver during the calendar year 1895 is estimated to have been $226,000,000.

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

TRINITY COUNTY—Continued.

NAME OF MINE.	Character of Mine	No. of Men Employed.	Location.	Name of Superintendent or Agent.	Address
Bloss & McCrary	Gold.	5	Trinity Center	Bloss & McCrary, Owners.	Trinity Center
Blue Jacket	"	2	5½ m N of Trinity Center	G. L. Carr, Own	Carrville P. O.
Bonanza King Con.	"	8	Near Trinity Center	Volmers & Doty, Own	Trinity Center
Brown Claim	"	2	6 m NW of Carrville P. O.	— Brown, Own	Carrville
Boyd	"	2	1 m SW of New Riv. City	A. Boyd, Own	Denny P. O.
Brizard	"	2	½ m N of Cœur	A. Brizard, Own	Arcata
Brown Claim	"	2	3½ m NW of New Riv City	Saml Brown, Own	Denny P. O.
Boomer	"	3	½ m SE of New Riv. City	T. J. Ladd, Own	Denny P. O.
Badgely Claim	"	2	18 m N of Coleridge	Badgely Bros., Own	Coleridge
Bodeker	"	2	17½ m N of Coleridge	Bodeker & Co., Own	Coleridge
Big Bar	"	3	Big Bar	W. A. Patterson, Own	Big Bar P. O.
Big French Bar	"	5	1½ m E of Taylors Flat	Warren, Van Winkle & Co., Own.	Big Bar P. O.
Boles	"	2	7 m S of Frances	Boles & Lundberg, O'n	Frances
Chloride Mine	"	4	2½ m NE of Dedrick	Dr. Blake, Q. W. Smith & H. R. Given.	Weaverville
Chapman & Fisher	"	14	3½ m S of Junction City	Chapman & Fisher	Junction City
Caribou	"	5	23 m W of Trinity Center	J. C. Abrams, Own	Abrams P. O.
Capitol	"	4	5 m NE of Trinity Center	H. M. Pitman, Own	Trinity Center
Coombs Springs	Water.		21 m S of Douglass City	— Coombs, Own	Douglass City
Carrie	Gold.		½ m NW of New Riv City	Geo. Ferney, Own	Denny
Clinton	"		4½ m SW of New Riv City	Wm. Clinton, Own	Denny
Canadian Bar	Gold.	15	Taylors Flat	David Finch, Own	Natoma
China Creek	"	3	12 m S of Frances	W. J. Nichols, Own	Burnt Ranch
Clark	"	2	7 m N of Frances	Clark & Barlen, Own	Frances
Dannenbrink Claim	"	5	4 m S of Dedrick	Dannenbrink Est., O'n	Junction City
Davis Evans Mine	"	7	¼ m S of Dedrick	J. Day & T. Begel, Own	Junction City
Daisy	Gold quartz.	4	5½ m NE of Lewiston	Mrs. Blakemore & H. Springsted, Own.	Lewiston
Deep Bank	"	5	23 m NW of Trinity Center	F. J. Abrams & W. B. Blackburn, Own	Abrams P. O.
Dixon Claim	"	2	14½ m N of Coleridge	John Dixon, Own	Coleridge
Don Juan Point	"	5	8 m N of Taylors Flat	W. Husted & Co., Own	Big Bar
Dungan	"	2	6 m S of China Flat	Thos. Dungan, Own	China Flat
Electric Light	Gold.		Near Weaverville	Dr. Blake	Weaverville
Emmet	"			Shields, Donahoe & Hollingsworth.	Deadwood
Evans Bar	"	6	5 m from Junction City	H. H. Carr & Sons, Own	Junction City
Excelsior	"	2	¾ m SE of New Riv. City	Frank Colgrove, Own	Denny P. O.
Elmi Claim	"	2	16 m N of Coleridge	John Elmi, Own	Coleridge
Fisher Gulch & Bonanza	"	3	9 m N of Junction City	S. L. Blake, C. W. Smith et al, Own.	Weaverville
Fountain Head	"	2	5 m NW of North Fork	H. Jenkans, Own	Weaverville
Frick & Davis	"	2	1½ m NW of Deadwood	Frick & Davis, Own	Lewiston
Forget Me Not	"	3	4 m NW of Trinity Center	G. L. Carr, Own	Carville P. O.
Ferguson	"	2	9 m S of China Flat	S. Ferguson, Own	Burnt Ranch
Globe Mine	"	6		R. Woodburn, Own	Dedrick
Golden Chest	"	4	5 m N of Coleridge	L. P. Drexler & J. Whittier, Own	Coleridge
Gilrean Mine	"	2	At Deadwood	C. E. Gilrean, Own	Deadwood
Gray Eagle	"	2	3 m N of Centerville	F. Dennick & P. G. Blake, Own.	Trinity Center
Gray Eagle	"	2	3½ m N of Trinity Center	F. Dennick & P. G. Blake, Own.	Trinity Center
Golden Gate	"		½ m NW of New Riv City	G. Gutzen, Own	Denny P. O.
Grover Cleveland	"		½ m W of New Riv City	Fred Loring, Own	Callahans
Hays Mine	"	40 to 50	1 m W of Junction City	E. Saladin, Supt	Junction City
Haas Mine	"	5	1 m SE of Junction City	F. G. Haas	Junction City
Headlight	"	3	3 m N of Centerville	F. Dennick & P. G. Blake.	Trinity Center
Headlight	"	3	3 m N of Trinity Center	F. Dennick & Co	Trinity Center
Himes Claim	"	2	19 m NW of Trinity Center	W. H. Himes	Trinity Center
Hard Tack	"		½ m N of New River City	T. J. Ladd	Denny P. O.
Hirschberger	"	2	8 m N of Frances	Jake Hirschberger	
Hunter	"		½ m W of Cœur	T. J. Ladd	Denny P. O.
Hard Times	"		½ m N of New River City	Fullmore & Miller	Denny P. O.
Hidden Treasure	"		1 m S of New River City	Ladd & Irvine	Denny P. O.
Highland Bar	"	3	Taylors Bar	Pelletran & Hodges	Big Bar
Hayward & Martin	"	2	½ m E of Taylors Flat	Haywood & Martin	Big Bar
Hawkins Bar	"	4	5 m S of China Flat	Jerry Smith	Burnt Ranch
Halz	"	2	6 m E of Frances	Halz & Stabell	Frances
Hobocken & Grand Slide	"	4	13½ m S of Frances	M. M. Johnson, Own	Frances
Hansen Claim	"	2	9½ m S of China Flat	J. C. Hansen, Own	Burnt Ranch
Indian Gulch	"	4	9 m SE of Douglass	F. and A. Rogers	Indian Creek
Ingleside	"	2	1 m N of Minersville	Dunn & Seward, Own	Minersville
Junkaus Ranch	"	13	1½ m SW of Weaverville	H. Junkaus, Own	Weaverville
Jim & Co	"	5	Near Weaverville	Chinese Co	Weaverville
Joe Kabuski	"	2	2½ m N of Minersville	J. Kabuski, Own	Minersville
Jacobs Bros. Claim	"	2	3 m W of Junction City	Jacobs Bros, Own	Junction City
Jacob Ham Claim	"	3	7 m SE of Junction City	W. E. Read & Gorham, Own.	Junction City
Jim Sing	"	19	6½ m NE of Lewiston	Jim Sing & Co., Own. (Chinese.)	Lewiston
Jumbo	"		10 m NW of Cœur	W. R. McDowell et al, Own.	Denny
Johnstone Claim	"	2	18 m N of Coleridge	A. Johnstone, Own	Coleridge
Jenkins	"	4	6 m S of Jenkins	Geo. Jenkins, Own	Frances
Kierman	"	5	9 m SW of Edgewood	P. Kierman, Own	Gazelle (Siskiyou Co.)
Kong-He Kong Claim (formerly Coyle)	"	17	Trinity Center	Ong Dean et al, Own	Weaverville
Keeley Mine	"	2	1 m E of Big Bar	Mrs. M. Keeley, Own	Big Bar
Koon	"	2	8 m S of China Flat	John A. Koon, Own	Burnt Ranch
Kirby	"	2	3 m SW of New River City	M. Kirby, Own	Denny P. O.
Keystone	"	12	10 m N of Coleridge	Geo. W. Wilson Supt.	Coleridge
Keatch	"	2	15 m S of China Flat	John Keatch, Own	Burnt Ranch
La Grange M. Co.	"	40	4 m W of Weaverville	La Grange M. Co., W. H. Radford, Supt.	Weaverville
Lyons, B., & Co	"	3	4 m W of Weaverville	H. Junkaus et al, Own	Weaverville
Lone Jack	"	8	1 m S of Coleridge	U. G. Day	Coleridge
Last Chance	"	2	4 m S of Junction City	Joe Ham and F. Marsh, Own.	Junction City
Laibrand & Larens	"	8	5 m W of Junction City	Laibrand & Larens, Own.	Junction City
Langs Bar	"	15	5 m S of Junction City	Chinese Co., Own	Junction City
Little French Bar	"	4	2 m E of Taylors Flat	Spencer & Co., Own	Big Bar
Little Prairie	"	3	4 m W of Big Bar	I. Zeigler, Own	Big Bar
Lower Smedes Bar	"	2	4½ m N of Taylors Flat	Geo. Bach, Own	Big Bar
Little & Co	"	6	8 m N of Taylors Flat	Little & Co., Own	Big Bar
Maple Mine	"	2	1½ m S of Dedrick	J. M. Fountain et al, Own.	Dedrick and Weaverville
Mahoney & Wallace	"	6	¾ m S of Dedrick	Mahoney & Wallace, Own.	Dedrick
Minersville Hy. G.M. Co	"	30	3 m N of Minersville	C. de Kengoly, Supt.	Minersville
Morrison & Van Sickles	"	2	½ m N of Minersville	Morrison & Van Sickles, Own.	Minersville
Montolano	"		31 m NW of North Fork	T. C. Dedrick, Own	Junction City
Minersville	Placer.	3	2 m N of Minersville	D. Bolton & Son, Own	Minersville
Masterton Bros.	Quarry	7	8 m E of Weaverville	Masterton Bros., Own	Red Bluff
Mohawk Claim	Gold.	2	5 m N of Trinity Center	P. L. Carr, Own	Carrville
Mary Blaine	"		1 m S of New River City	S. B. Brooks, Own	Cœur P. O.
Modoc	"		½ m N of Cœur	G. W. Healey, Own	Cœur P. O.
Moore Claim	"	3	16 m N of Coleridge	Mrs. Moore, Own	Coleridge
Martins Bar	"	2	1 m E of Taylors Flat	Larsen & Carlsen, O'n	Big Bar
Martins Flat	"	2	6 m N of Burnt Ranch	David B. Gray, Own	Burnt Ranch
McLill	"	2	16½ m N of Coleridge	Theo. McLill, Own	Coleridge
North Star	"	2	6 m N of North Fork	H. Junkaus, Own	Weaverville
Ninety-Four	Placer.	1	17 m NW of Trinity Center	J. F. Becker, Own	Trinity Center
New Hope	Gold.		15 m NW of Trinity Center	J. Benson & J. B. Bowman, Own.	Trinity Center
Nonpareil	"		8 m E of Frances	C. S. McAtee, Own	Frances
Nisbrink	"	2	5 m W of New River City	Nisbrink & Co., Own	Denny
New Moon	"	2	At New River City	G. W. B. Yocum & Son, Own.	Denny
New York Bar	"	3	8 m N of Taylors Flat	J. Moody, Own	Big Bar
Noble	"	3	5 m S of Frances	Noble Bros., Own	Frances
Nicholson	"	2	4 m S of Frances	T. M. Nicholson, Own	Frances

—*Begun in issue of April 25, '96. (To Be Continued.)

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUGUST 11, 1896.

565,606.—BALING PRESS—A. Barrett, Puyallup, Wash.

565,828.—CARBURETER—D. Best, San Leandro, Cal.

565,426.—CURLING IRON HEATER—Bowman & Kerr, Mt. Vernon, Wash.

565,611.—WHEEL TIRE—H. J. Dykes, Peralta, Cal.

565,617.—WINDOW—J. J. Hall, Los Angeles, Cal.

565,765.—WRITING PAD—W. T. Martin, Dayton, Wash.

565,497.—MINER'S IMPLEMENT—T. J. Murray, Grub Gulch, Cal.

565,503.—TANK—F. H. Pfluger, Portland, Or.

565,569.—PIPE CUTTER—Roberts & Hollister, Downey, Cal.

565,801.—RAILWAY RAIL PLATE—C. J. Schenck, Gila Bend, A. T.

565,802.—FAUCET—C. J. Schuster, S. F.

565,517.—CAR COUPLING—W. Shay, East Portland, Or.

565,805.—AIR SHIP—C. A. Smith, S. F.

565,608.—HOSE CLAMP—C. Sparks, Pacific Grove, Cal.

565,646.—FORCE PUMP—A. W. Thierkoff, Redding, Cal.

565,654.—CREAM SEPARATOR—T. Willing, Astoria, Or.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VALVE FOR SIPHON BOTTLES.—Frank E. Morrill, San Francisco, Cal. No. 565,173. Dated August 4th, 1896. This invention relates to an improvement in valves for that class of bottles which are adapted to contain effervescent liquids under pressure, and which are known as "siphon bottles." The object of this invention is to so connect the valve with a movable actuating piston that the valve is opened by a direct pull of the piston, thus preventing the valve from becoming so seated that it cannot be opened to allow of the escape of the liquid. It consists in the metallic perforated head having a projecting stem, and a rubber diaphragm cast about and enclosing said head and filling the perforations thereof to form a bond; a plunger and a means for permanently connecting it with a projecting stem so that the movements of the plunger are conveyed directly to move the central portion of the diaphragm.

PULVERIZING MILLS.—Thomas McGlew, San Francisco, Cal. No. 565,176. Dated August 4th, 1896. This invention relates to an apparatus for pulverizing and grinding ores or other material, and consists in the combination of a series of vertically journaled concaved rollers with a circular pan having a concaved die around its periphery, and interposed balls which are caused to travel around between the rollers and the pan by motion transmitted to them through the movement of the rollers around a central axis, said rollers being also turnable about their own axis. The rotatable concave-faced rollers are carried by arms and suspended out of contact with the bottom of the pan, the balls fitting the spaces between each adjacent pair of rollers and between these and the periphery of the pan, so that as the balls roll against the interior of the pan they are caused to rotate upon their own centers and in turn transmit motion to rotate the rollers upon their own axis while revolving about the central axis upon which they are supported.

SASH FASTENER.—Frederick E. Jarvis, Oakland, Cal. No. 565,168. Dated August 4th, 1896. This invention relates to a device for locking the sashes of windows so as to prevent their being opened without the use of the proper key. It consists of spring-actuated bolts movable at right angles with each other, one of said bolts engaging holes so as to lock the lower sash and the other to lock the upper sash, a spindle having a cam adapted to engage the lug upon one of the bolts whereby the upper sash is released, and arms engaging the lower bolt to release the lower sash, a case within which the mechanism is contained, an elastic arm upon the spindle adapted to engage a lug on the cover of the case to prevent the turning of the spindle and a key engaging slots in the exposed end of the spindle to first disengage the arm from the stop lug and then to turn the spindle so as to withdraw the bolts.

ICE PALACE.—Charles F. McGlashan, Truckee, Cal. No. 565,175. Dated August 4th, 1896. This invention relates to a method of constructing framework to be afterwards covered with ice so as to form what is known as an "ice palace." It consists of a structure comprising parallel walls of permanent openwork material, an intermediate filling of filiform substance and a mass of ice enclosing the walls and filling and supported thereby, this mass being produced by spraying or distributing water through and over the same in a freezing temperature so as to produce a solid body.

VEHICLE WHEEL TIRE.—Hugh J. Dykes, Peralta, Cal. No. 565,611. Dated August 11, 1896. The object of this invention is to provide a tire of the cushion class which shall be simple in construction, not liable to get out of order, and which will avoid all the difficulties, particularly puncturing, of pneumatic tires, and at the same time shall be very light and durable. The tire consists of a body composed of cork, in sections or otherwise, said cork being circumferentially ground, a tie line seated in said groove whereby the cork is held to the rim, an independent cushion circumferentially directed and seated in the groove of the cork body and a covering over said cushion and body.

CARBURETER.—Daniel Best, San Leandro, Cal. No. 565,828. Dated August 11, 1896. This invention relates to that class of gas generators which are adapted to be used in connection with explosive engines, and in which the oil or substance to be vaporized is passed through a generating chamber, where it is subjected to heat either from the exhaust of the engine or otherwise, and the vapor thus produced is mingled with air which is admitted in proper proportions to produce an explosive compound. It consists of concentric casings with exterior air inlets and interior air exits, cones disposed within the interior chamber, an inlet through which oil is admitted and distributed over the surfaces of the cones, where it is vaporized and mingled with the air, an outlet through which the explosive gas or vapor is discharged and an intermediate space or passage through which heat is transmitted between the air chamber and the oil chamber.

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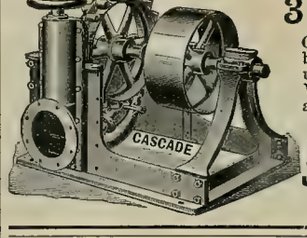

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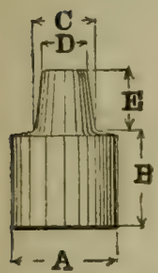

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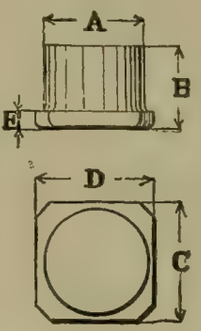

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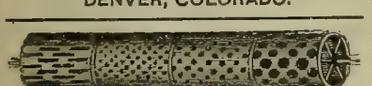

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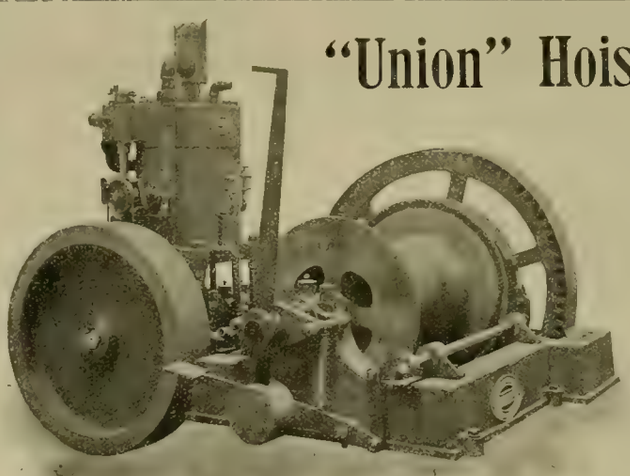

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MERCUR.

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The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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Mining Summary.

CALIFORNIA.

Amador.

Gravel mines are being reopened near the Rancheria mines, which produced a large amount of gold in early days, and the results so far promise well.

At the Central Eureka the new machinery was started up last week.

It is reported that the Maximilian mine, owned by George Allen, has been sold for $30,000.

The station has been cut on the 1300-foot level in the Argonaut.

A new steam hoisting plant is being put in at the Oneida, which is being developed by the Exploration Company of London.

The large three-compartment shaft in the Bellwether mine near Jackson is down 100 feet.

The 10-stamp mill of the Good Hope mine will be in operation September 1st.

The compressor at the Central Eureka is now in place and work has been resumed.

The old Mechanics mill of 10 stamps has been hauled from Sutter Creek, to be erected on the Good Hope property.

At the Reward mine, near Pine Grove, it is proposed to increase the number of stamps in the mill from 5 to 15 or 20.

There are 125 men now employed in the Wildman and Mahoney mines.

Republican: At the Wieland mine the repairs have been made and the machinery is again in working order. The superintendent reports that some good rock had been struck.

At the Fellowcraft, formerly the Bodie mill, the company is erecting a 10-stamp mill on the property which will shortly be completed, and they hope to be running in three weeks. So far the work in the mine has only been in the direction of cleaning up and putting in new appliances. The shaft is down 220 feet and ore of a low but pay grade was found all the way from the top down. Prof. Hobbs, professor of chemistry in the Western Reserve University, is manager of the mine.

There are in the neighborhood of Sutter Creek forty-seven mills running night and day. None are over a mile apart and two are within five blocks of the postoffice. Some of them are the Kennedy, 40 stamps; South Eureka, 20; Mohona, 40; Wildman, 40; Spring Hill, 40; Keystone, 40; Bunker Hill, 40. And yet with all these mills this mining district is still in its infancy, and there are yet undeveloped mines here that would yield millions if men with capital would take hold.

Butte.

It is reported that Messrs. Diamond and Chambers will shortly erect a 60-stamp mill on Brush creek.

W. W. McMillan is beginning to ship quartz from the Resumption mine to the Phœnix mill.

Mercury: The two elevators of the Golden Feather, Limited, lift 18,000,000 gallons of water each in 24 hours for a distance of over 50 feet, or 2000 tons of gravel per hour, the same distance. There is used 460 inches of water, with a pressure of 155 pounds to the square inch for each elevator. The elevators are patented by Mr. Geo. H. Evans, manager of the English syndicate mines.

Calaveras.

At the Esperanza, formerly the Boston mine, near Mokelumne Hill, 20 stamps are running regularly and 10 stamps are being added.

Prospect: A man at the Lewis mine at Copperopolis dug out a nugget valued at $150. A few months ago a chispa was found in this mine valued at $270.

At the Gwin mine the work of grading for the 40-stamp mill has been completed and building will commence this week. The shaft is now down over 1335 feet and stations are being dug at the 1200 and 1300-foot levels.

The tunnel in the Hexter Mining Co.'s claim at Mokelumne Hill has reached a depth of 450 feet. The purpose of the company is to tap the great Stockton Hill gravel channel and also a large quartz ledge which passes through the mountain.

It is reported that the Hartman blue gravel mine in Old Woman's gulch has been bonded to San Francisco parties for $10,000, and the work of putting up a hoist and sinking a new shaft will be begun at once.

Citizen: Work on the Bund mine is being diligently prosecuted under the directions of the California Exploration Company.

The new 70-horse power boiler for the Fellowcraft mine was brought up from Valley Springs last week.

Angels *Voice*: Superintendent Hooper of the Falcon mine has suspended work in all the drifts and tunnels and concentrated his force on the main shaft, which will be driven to greater depths as fast as eight-hour shifts are able to do so.

El Dorado.

(Special Correspondence).—The Boulder, 16 miles southwest of here, started the new 10-stamp mill ten days ago. Everything moves along like the mechanism of a well-regulated timepiece.

At the Baltic, 25 miles east, the shaft is 90 feet, a tunnel is in 260 feet and a drift on the vein is 310 feet. The ledge is 4½ feet of good ore. There are 500 tons of rock ready for milling.

Papers were made of record last week bonding the Pyramid mine and mill to G. P. Rixford of San Francisco. This property is three miles from Shingle Springs.

The Lucky Marion, near Greenwood, is preparing to erect a 10-stamp mill.

On the Welch mine, 17 miles north of Placerville, two shifts began underground work last week.

The Big Four—Messrs. Rhodes, O'Brien, Humphreys and Horning—who have been prospecting the county for the past few months, have a bond on Judge Bennet's property, near Garden valley, ten miles north of here. Their shaft is in about 50 feet. They milled 37 tons of ore at the Big Sandy, which netted them $12 per ton in free gold. These men are an intelligent advance guard in their method of prospecting and developing a mine.

Barry, Carmen & Goff of Oakland are opening a claim two miles east of Clarksville, in the western portion of this county. Their tunnel to crosscut the ledge is 250 feet. At the bottom of a 40-foot shaft the ledge is 3 feet in good ore.

The advent in the mining field at Kelsey of a vivacious young lady in the person of Miss Maggie Kelly, as a practical operator, is encouraging even sturdy men to take more active interest in developing the slumbering resources of that section. Kelsey is six miles north of Placerville, and its old time properties abandoned at water-depth carry good records as producers. They are justly receiving new attention.

The Victor Quartz Mining Company began last week on preparations for sinking shafts and running tunnel. This is near Slate mountain, ten miles northeast of here.

Work on the Blue Gouge is progressing favorably, and though it is still of an experimental nature, the results are very gratifying. It is 25 miles east of here and is controlled by Head, Bishop, Bind & Reeg.

Despite campaign matters, activity in searching for mining properties is not waning in this section. There are a dozen mining capitalists from abroad here at present writing.

Placerville, Cal., Aug. 18th, '96.

Gazette: The Welch mine at Greenwood, which has been closed on account of bad air, is again in operation with two shifts of men.

J. T. Smith has bought the White Elephant mine of the Lee Bros. at Greenwood.

The Lucky Maran has closed down until the company can get their mill up.

Democrat: The new mill at the Boulder mine, sixteen miles southwest of Placerville, has started up. Since April the owners have built 2600 feet of tramway, eight miles of ditch, seven miles of roads, and done 1500 feet of underground work, built and started a 10-stamp mill.

Kern.

Californian: In the Randsburg district there is not an idle man in camp. The only drawback is want of water, which is hauled twelve miles from Garlock and sells for $2 a barrel. At Garlock is an 8-stamp custom mill and six miles below another of 5 stamps. Patrick Reddy, the lawyer, who owns a one-fourth interest in the Burcham claim, has a project on hand to supply the camp with water by a pipe line from a water location at Garlock.

The Mammoth, Little Mammoth and Tom Lane mines, in Kern county, have been purchased by the Los Angeles Gold Mining Company. The company consists of H. M. Russell, N. F. Wilshire and O. Pooley of Los Angeles. The present owners will put up a 10-stamp mill at once, which will be worked by water power generated from the Kern river. They will also put up a tramway to conduct the ore from the mine to the mill. The ore, which is free gold, will be worked by cyanide process.

Mariposa.

(Special Correspondence).—John S. Wilbur, formerly superintendent of the Valley road at Stockton has sold the Reynolds group of mines on the North Fork of the Merced river, 12 miles from Coulterville. The Reynolds mines are in what is known as the eastern belt of the mother lode, and a substantial amount of prospecting and development work has been done on the property.

There is nothing doing on the Mariposa grant of any importance. By last accounts John D. Ludwig, the superintendent, was visiting in Tennessee.

Chas. T. Lindner has arranged a sale of his Powhattan, Tennessee, Independent, Constitution, Marion and Ticonderoga claims on the North Fork river four miles from Benton Mills. These claims, which are as well situated as any in the district for easy and cheap working, will be operated by a strong company which is now being incorporated.

Angus Mackintosh has bought the Hayseed and Triumph mines for $10,000 from James B. and James H. Helms. These mines are situated about one mile from the Tendron mine at Whitlocks and six miles north of Mariposa. The Messrs. Helms have worked them at a profit for twelve years past with very imperfect machinery. Mr. Mackintosh will now equip them with a complete new plant.

The Sellick mine at Haywards, four miles from La Grange, is making good progress under the direction of J. F. Clapp, a Chicago mining expert. The shaft is down 150 feet and drifts are being driven both ways on the ledge. The rock shows free gold in considerable quantity. A hoisting plant and mill will be put in position shortly. Mr. Heaton, formerly of the old Dan Heaton mine is superintendent.

Captain A. H. Ward is now in Coulterville, and has resumed development work on the Penon Blanco mine.

The Merced Gold Mining Company continues work as usual and development goes on steadily.

The Melvina shaft is now down about 600 feet, and sinking will continue as quickly as possible for at least another 400 feet.

The Tyro mine, one mile from Coulterville, is working full-handed and the mill is running night and day. The mill returns are not made public but are understood to be satisfactory. The rock being crushed is from the 700-foot level. The Laura La Grange mine at Sugar Pine Gap, near Hazel Green, thirty miles above Coulterville is doubling its mill capacity. The owners, Messrs. Macfarlane and Duncan, have been working with five stamps, making test runs. They propose to add another five stamps and will now crush for revenue. The rock is very easy to mine and mill, and the mill tests, so far made, have shown it to be worth from $30 to $50 a ton.

Dr. E. S. O'Brien of Merced and partners are doing extensive development work on the Mabel and Ethel mine near Mariposa.

It is stated that the Red Banks mines, eight miles southeast of Coulterville, have been shut down for the present. Material is on the ground for the construction of a dam in the Merced river for power purposes. The dam was to have been begun by this time but recent rains in the Yosemite Valley have raised the river and caused the delay necessitating stoppage of work.

The Bunker Hill Mining, Milling and Power Company has acquired the Bunker Hill, Monster and Emmett mines about six miles southeast of Coulterville and have put a crew of men to work. The company is arranging for the immediate erection of a 10-stamp mill, and within a years' time expects to have enough ore opened out to supply a 20-stamp mill for at least twenty years to come. The superintendent is Wm. B. McSherry.

Chas. T. Lindner, electrical engineer, has completed the prelimenary syndicate which is to erect an extensive distributing electrical power plant near Benton Mills. The water power for generation purposes is taken from the Merced river at the Broadhead old dam, about eight miles above the site of the power station. There is a fall of about 275 feet, which will give a capacity of at least 5000 horse power in the driest season. Messrs. Allardt and Luckhardt will arrive on the ground next week to complete the final surveys and lay out the construction work.

Coulterville, Cal., Aug. 18, '96.

Mono.

In the Bodie Con. on the 200 level the long east crosscut is advanced 16 feet, cutting small seams of quartz. The Gildea raise through the old stope was extended 25 feet in gold fillings. On the 300 level the raise from the long east crosscut on the second soft vein was extended 17 feet, connecting with the 200 level. The north drift from the 550 incline level was advanced 8 feet on a 2-inch streak of high grade ore. In the Fortuna vein they are stoping out a small pillar of ore below the 550 incline level. Extracted during the week 2½ tons of $25 fillings from the Gildea vein.

In the Mono mine, on the 400 level, the track and air-pipe have been removed from the east crosscut from the south drift, and the track has been laid in the Bodie Con. south drift on the Fortuna vein, the same having been cleared out. Work will begin in the face of the drift immediately. The surveying work in the recent crosscut and other workings that are open on the 400 level is completed.

Nevada.

It is reported that pay quartz has been struck in the Summit mine.

A strike of high-grade ore on the 600-foot level of the old Pittsburg mine in Gold Flat is reported.

Transcript: The repairs and improvements at the Providence Mining Company's 40-stamp mill are going forward.

The mine never looked better than it does now; and although a number of men were laid off when the repairs to the mill were begun, they will all be put on again as soon as the mill is running at its full capacity. There is ore enough in sight to keep the mill running indefinitely.

Transcript: A quartz ledge has been struck on the 600 level at the Pittsburg mine. For some time past tributers have been working the mine and making good pay.

Union: Superintendent Mather of the Plumbago, above Moore's Flat, reports that the mine is looking fine. It will be remembered that a few months ago some rich ore was taken out, and it now looks as if the present strike will turn out better than the first one.

Placer.

Colfax *Sentinel*: The Hidden Treasure at Sunny South had one of the best cleanups last month that it has had for years. Nearly 100 men are employed at the mine.

Captain Montgomery, owner of the La Trinidad mine in Sailor canyon will place a mill on the property this season. Fifteen men are now employed.

The Wild Yankee, owned by Schilliansky, Oakes & Co. of Towle, near the old Develey claim, about a half mile from Shady Run, has been put in shape for next winter's work.

The Redstone mine at Blue Canyon, purchased last spring by an Eastern company, is now operating in good shape with a 10-stamp mill and the ore looks very promising.

Some good paying gravel was struck in the Alta mine last week. It is of the same nature as that within the Hidden Treasure.

A strike is reported to have been made in the Westchester tunnel on the Black Hawk drift mine, near Forest Hill, which was originally started in 1857.

A new drift mine is being operated at Codfish Point, three miles below the Wise and Partridge claim, on the south side of the American river.

Preparations are being made to run a 500-foot tunnel from Devil's Canyon into the channel on the Ashland claim, recently purchased by A. Clark from G. S. Sanborn.

E. A. Wiltsee of San Francisco has charge of the development work at the Drummond quartz mine. A contract has been let to run 5200 feet of tunnel to tap the ledge 400 feet below the present workings.

Plumas.

The mill at the Genesee Valley Mining Company's mine has been destroyed by fire, caused by a defective stove pipe. It is understood that the company will rebuild immediately.

Work has been resumed at the Swearington mine.

San Diego.

(Special Correspondence).—At Rice mining district Messrs. Frizell, Bevinton and Farnsworth took $100 in gold out of three tons of N. G. ore last week.

All ore to be crushed from the Rice mining district has to be taken to Banner to Bailey's mill, a distance of 17 miles. This shows a mill is required in the district.

Twelve miles distant from the Rice mining camp lies the Chewawa district. The ledge has been bonded to a Fallbrook company. They call it the U. S. Mint. Rice Brothers are there.

At Banner district, at Cout's mine, on Sunday, the main shaft is in 200 feet; they are still sinking. The "Rancheta" is the name of his mine. I met Frank M. Leland there. He represents the Risdon Iron Works in San Francisco. A mill of five stamps is going up immediately.

N. Bayley is at work on his mine, called the "Kentuck."

At Julian the Owens mine is at work, a force of men being employed. Things are brighter in Julian than usual in mining.

Julian, Cal., Aug. 14th, '96.

The Nectar mines, Picacho, have been bought by a Philadelphia syndicate. Development will immediately follow, and a large mill is to be added.

The Venturina Mining and Milling Company's mining claim is located one mile southwest of Banner, and is composed of the Cable, Vevay, Fraction and Switzerland mines. Three gold quartz ledges are on the property, all of which have been good producers. The company has lately let a contract for 400 feet of extension to a tunnel now in 260 feet. This is expected to tap a rich chute of ore at a depth of 400 feet, which has milled from $40 to $60 per ton near the surface. The address of the company is San Diego.

Sierra.

Messenger: The Garnett Gold Mining Company, lately organized, has acquired the property known as the Bunker Hill and Niagara Consolidated gravel mines, situated above Gibsonville, the former being in Plumas and the latter in Sierra county, and adjoining each other.

Siskiyou.

Journal: At the Mabel mine, near Scott Bar, 150 tons of ore await the new mill.

The new company which has just purchased the Ben Shinar mine on the Klamath river, at Thompson creek, is making preparations for working its new mine on an extensive scale.

It is said that the hills around Sawyer's Bar are full of prospectors, and some good mines have been located this season.

Journal: The new quartz mill at the Nebraska mine on Cherry creek is to be started up soon.

Fernandez & Co., of the placer mine on Cherry creek, brought to the Siskiyou County Bank in this place last Saturday 543 ounces of gold dust, the result of the past season's work of 20 men employed.

The Steamboat mine, in McAdam's creek, will be started up again and will be worked on an extensive scale. The machinery which was put in about a year ago is the best that could be found, and the company that owns it has plenty of capital; so the mine will be worked for all there is in it.

At the Bailey & Carrick mine, at Greenhorn, they are about ready for another crushing.

Trinity.

Under date of the 12th inst., J. S. Strode writes from Trinity Center that his mine, the Oro Grande, is the only one in that district running a stamp mill, and is not sold or bonded to any one.

Tuolumne.

A contract for the masonry work of the new hoist at the Dutch has been let.

The tunnel between the Shawmut and Eagle, which will be 5700 feet in length, will be completed next month.

San Francisco capitalists have beeen examining the Frank Marcom mine with a view to its purchase.

NEVADA.

STOREY COUNTY.

The Con. Cal. & Va., reports: West crosscut 2, started at a point in north drift 550 feet north from Con. Va. shaft station, or 85 feet south from north boundary line of mine, has been extended 30 feet, passing through porphyry and clay with lines of quartz assaying $1 per ton; total length 570 feet. Face is dry and does not show any seepage of water. On the 1650 level, on ninth floor, first floor above sill floor of this level, the south drift from east crosscut from drift run south from end of the stope has been extended 19 feet, passing through porphyry, clay and quartz assaying $1 and $2 per ton; total length 509 feet.

On the 1750 level, from thirteenth, fifteenth, twenty-first and twenty-second floors above sill floor of this level, at north end of stope in old ground of former workings, have extracted during the week 142 tons of ore, average assay value of which, per samples taken from cars in mine, was $49.76 per ton. South drift from twenty-fourth floor from end of west drift has been extended 9 feet, through old stopes and fillings, assaying $20 to $30 per ton. Total length 15 feet. From upraise carried up from northwest drift from main west drift from C. & C. shaft, 50 feet above sill floor of this level, from end of east crosscut No. 2, a north drift has been advanced 28 feet, through porphyry and quartz, assaying $3 and $4 per ton. Total length 56 feet. Total extraction of ore for week amounted to 142 tons, average assay value of which, per sample taken from cars when raised to surface, was $45.65 per ton.

On the Brunswick lode at shaft No. 1 the shaft has been sunk 15 feet on the incline, passing through porphyry and stringers of quartz; total depth 566 feet. On the 300 level they have advanced main north drift from station 57 feet; total length 238 feet. The face is in porphyry and stringers of quartz.

On the 200 level in Chollar the south drift has been advanced 17 feet and is now out 246 feet south from the Chollar north line; the face is partly in the foot wall, a small streak

of quartz and soft porphyry being exposed. On the 300 level the south drift has been advanced 42 feet and is now out 163 feet south of the north line. For a distance of 155 feet south of the north line the face shows a width of from 18 inches to 2 feet of good ore, since which time porphyry has predominated.

Shaft No 2 was sunk 10 feet on the incline; total depth 317 feet; bottom in hard porphyry. On the 150 level the main south drift, started from east crosscut No. 1, was extended 8 feet; total length 129 feet; face in porphyry and stringers of quartz.

Chollar shipped to the Nevada mill for reduction during the past week 120 tons and 1400 pounds of ore, car samples averaging $32 per ton.

In Alta the west drift on 725 level was driven 24 feet in hard trachyte; total length 100 feet. The winze in the Keystone vein, 825 level, was sunk 6 feet in quartz of some value; total depth 30 feet.

In Occidental on the 550 level have discontinued drifting and have started a west crosscut from the hanging wall, which has been extended 25 feet; face in porphyry. On 650 level we have advanced 30 feet; total distance 75 feet; face in vein matter. The raise from the 750 to this level has been advanced 31 feet. The south drift on 750 from the west crosscut has been extended 22 feet; total length 167 feet; face in low-grade ore. The winze started in the north drift is down 43 feet, and shows 2 feet of $20 ore in the bottom; advanced during the week 23 feet.

In the Savage mine on the 850 level the south drift from the fifth floor of the north upraise they have started three east crosscuts at points 35, 70 and 110 feet respectively south of the north upraise. East crosscut 1 is advanced 11 feet, passing through seams of quartz giving low assays. East crosscuts 2 and 3 are each advanced 12 feet and the face of each is in porphyry. The main south drift is advanced 82 feet. The face is in quartz giving some fair assays. East crosscut 3 is advanced 45 feet. The face is in clay and porphyry. On the 750 level the east crosscut from the main south drift is advanced 33 feet. The face is in porphyry and quartz. On the 950 level they are repairing and retimbering the airway leading to the Hale & Norcross mine.

OREGON.

EASTERN OREGON.

(Special Correspondence).—More than the usual degree of activity exists in the Cornucopia district, near Baker City. Reliable reports from that section are encouraging. They indicate that much more is being accomplished this season than any previous, and that the district is attracting the attention of investors and operators from other States.

The Virtue mine, which is owned by G. W. Grayson of San Francisco, is working about 40 men, developing mainly. A tunnel is being extended and a shaft is being sunk. The ore produced incidental to this work is shipped to Denver. The litigation in which the property is involved, it is anticipated, will reach a conclusion within a few weeks.

The Baisley-Elkhorn mine, located about 22 miles from the Virtue, is also pushing development with a force of about 30 men, and it is reported to be making a good showing. The upper levels were formerly pretty well worked out, but the company is now doing some sinking. The ore from this property is shipped to the Tacoma smelter.

The Flagstaff property, in the same district, owned by a French syndicate, recently began development work.

The group owned by W. A. Clark & Co., of Butte is being worked with a small force, and the White Swan, owned by Baker City people, is developing and shipping ore.

A number of properties in Crocker Creek country and in the Durkee district, both east of Baker City, are reported more or less active, but as yet no regular producing mines have resulted.

At Rocky Bar, Idaho, the Elmore Mining Company is developing its property and has put in an electric plant for light and to operate its drills.

Baker City, Aug. 15, '96.

Jacksonville *Times*: Minneapolis parties have paid $5000 to close the deal for the purchase of the Columbia mine on Cracker creek, Baker county. The balance of the $75,000 will be paid in a short time.

Palmer & Co. have resumed work on their ledge in Farmer's Flat district.

W. W. Mason, the mining expert, who has been examining the Miller ledge on Soldier creek, Josephine county, is building an arrastra, and a crosscut at 30 feet deep shows a body of good ore.

WASHINGTON.

The Okanogan mine, at Methow, has been sold to Seattle men.

The Red Shirt mine, Silver, Okanogan Co., has been sold to a Scotch syndicate. J. A. Stewart, the superintendent, will build a 20-stamp mill this fall.

Customs business of $5,000,000 for the port of Northport in one year is a record which few custom houses in the United States can equal. The balance of trade is in the United States' favor. The value of silver lead ores up to June 30th passing through the officials' hands, and on which duty has been paid, was $2,000,000. Forty thousand tons comprised the shipments, and they consisted of ores and bullion. Most of this came from the Slocan country, via the Pilot Bay smelter, and the duties on it aggregated $96,000. The Slocan Star and the Skyline are the heaviest shippers in that section. Gold ores have been shipped from Trail and other districts to the value of $2,000 000, a total value of ores for a year of $4,000,000. The exports show that during the year goods to the value of $1,000,000 have passed through Northport and have paid duty. By far the largest part of the exports have been groceries and foodstuffs. Every article which is consumed in prosperous mining camps is included in the lists of the customs collector. Rossland imports the bulk of goods.

The Occidental Gold Mining Company has filed articles of incorporation. The capital stock is $1,000,000.

The Snohomish *Tribune* reports that there is more activity than ever in the Silver Creek and Monte Cristo districts.

Barnato is the name of a new town being laid out in the Cedar canyon country. It is started by the Legitimate Mining and Smelting Co. of Houston, Texas, which has purchased a number of mining claims and is to erect a smelter. It is reported that copper, iron and lime are to be had in the vicinity.

BRITISH COLUMBIA.

Nelson *Miner*: A syndicate of Detroit and Toronto capitalists has bonded the Kennedy and Marshall groups of claims on the north fork of the Illecillewaet for $80,000, paying $5000 in cash.

A new town, known by the name of Ferguson, has been started at the forks of the Lardeau, fifteen miles from Thomson's Landing. It is surrounded by several groups of mines.

The Nelson smelter has closed contracts with the Nickel Plate, Crown Point and Columbia and Kootenay mines.

Work is to be commenced on the Bondholder group, on the Ten Mile divide.

The L. F. R. & C. Gold Fields Co. has bought the Oak Leaf and Maple Leaf at Illecillewaet for $90,000. A tramway and concentrator will be erected.

The same company has commenced work on the Broadview, Old Sonoma and Philipsburg claims.

Rossland *Miner*: The Le Roi is embarrassed with the quantity of ore on hand. The smelter people are unable to handle the surplus. Owto the fact that all the available space above is covered with ore, only about 100 tons a day are being raised, while the mine is capable of producing 300 tons a day.

ALASKA.

H. C. Thornton, back from Alaska, says he has twenty square miles of placer ground at Cook Inlet that will go $1 a yard. At another place he has eight square miles still richer. That is the kind of statement that misleads those who know no better and "rush" to a country that can give no such wealth; suffering hardships and exposure in pursuit of what does not exist.

UTAH.

It is expected that the mill at the Sacramento, at Mercur, will be working 100 tons of ore per day.

According to the Salt Lake *Tribune*, there is more development work going on at Mercur than ever before.

The Frisco Mining Company, which five years ago was a steady producer of bullion, but was closed down with the fall in silver, has made its first shipment under the new management of J. W. Langley and his associates.

The Eureka Hill mine, in Tintic, now has a force of 230 miners at work and in the mill 100 stamps are dropping.

Tribune: At Ophir canyon the DeLamar electric lighting plant will be completed this month, when the lights will be turned on in Mercur.

The managers of the Sacramento, at Mercur, which has lately paid its first dividend, have decided to increase the capacity of the mill to 100 tons daily, and, the material having been ordered, it is expected that the production will be increased to that figure within the next thirty days. The company has been to great expense in developing the ore bodies.

A strike has been made in the Primrose in Silver City. The results have been identical with those experienced by the owners of neighboring claims. For 75 feet the shaft was put through what is known as the iron zone, when, at a depth of 175 feet, 4 feet of ore was uncovered that assays 40 ounces in silver, 26 per cent lead and gold of the value of $2 a ton.

Salt Lake *Tribune*: Supt. Treweek reports another strike in the Mercur.

The Blue Jay in Beaver county, over which there has been much contention in the past, has been acquired by John G. Gray of Salt Lake, who proposes to begin its development.

Shipments of ore through the Mackintosh sampler at Park City last week were as follows: Silver King, first-class, 975,800 pounds; Silver King, concentrates, 436,500 pounds; Varco concentrates, 30,650 pounds.

Shipments from the Tintic district last week were as follows: Bullion-Beck mine, thirty carloads of ore; Bullion-Beck mill, ten carloads concentrates; Gemini, five carloads of ore; Eureka Hill, four carloads of ore; Ajax, three carloads of ore; Utah, six carloads of ore; South Swansea, one carload of ore; North Star, two carloads of ore; Dragon iron mine, four carloads of ore daily.

The Centennial Eureka mill distributed its regular $30,000 dividend last week, making a total of $1,800,000.

Tribune: At Park City the Crescent Co. has had a large force of men at work for some time retimbering the incline shaft and strengthening weak spots in the mine. The property will be in shape for immediate active work or for continued idleness, whichever policy the company elects to follow. To date the Peck Concentrating Co. has refused to make a direct bid for Crescent ore, and the company is undecided whether to repair the tramway for active work or not, as the value of the ore on hand cannot be estimated until a bid is made.

Supt. Hall of the Crown Point says work is being rushed at that property with three shifts and will continue without interruption. The property is thoroughly equipped with an 85 H. P. boiler and a 25 H. P. engine.

A part of the North Tintic mining district is situated within the limits of Fort Crittenden reservation. The question as to the validity of mining locations made within the reservation has for months past been one of great interest to claim owners in Camp Floyd and North Tintic mining districts, and attorneys of such owners. The date of throwing open the reservation was April 9th, 1895, and all locations of mining claims made prior to that time are void.

Tribune: The mines of Bingham are estimated to be in condition to make a present output of 10,000 per month, and practical demonstration would occur if the markets offered sufficient stimulus.

IDAHO.

The Gold Flint Mining Company has been incorporated in Salt Lake to do business in Idaho, with a capital stock of $1,500,000.

The Hunter has resumed business much sooner than was expected when the mill was shut down to do development work. An ore body has lately been struck and orders have been given to put on both shifts in the mill and enough miners to keep them busy.

MONTANA.

The Katie mine at Basin, which was closed down on account of the great fire of Aug. 13, 1895, is again starting up. The new mill will have a daily capacity of 500 tons. The company also contemplates building a smelter.

The Sitting Bull mine is again being worked.

Inter-Mountain: The closing down of the Anaconda Camp creek properties is a severe blow to the town of Melrose.

The Maggie, bonded to the Montana Ore Purchasing Co., is in operation.

There promises to be a lawsuit, if not greater trouble, over the possession of the Melrose mine, a gold property with a rich lead, on the Camp creek slope, arising out of the question of priority of location.

The Union Hill Gold Mining Company is prosecuting developments on the Union Hill and Hoodoo properties. This same company is also extracting ore from the Black Prince and Collecta and hauling it to the Galena smelter, which they intend to blow in in a short time.

SOUTH DAKOTA.

Articles of incorporation have been filed with the Secretary of State for the Western Mining and Milling Company, with a capital stock of $1,000,000; principal place of business, Deadwood; and for the Sunnyside Mining Company at Hill City, with a capital stock of $300,000.

Black Hills *Times*: The Anna Creek Gold Mining and Milling Co. has been organized in Deadwood by capitalists of Pittsburg, Pa., with a capital of $1,000,000. The company has $350,000 in its treasury to erect a smelter with a capacity of 100 tons daily.

From forty to fifty tons of high-grade siliceous ore is being shipped every week from the surface workings of the Deadwood-Terra. The ore is reported to have an average assay value of $100 gold per ton.

Black Hills *Times*: William McMillan of Jim creek, eighteen miles southeast of Deadwood, has been made a proposition by the D. & D. smelter to take a carload of twenty to twenty-five tons per week of his copper ore at $30 per ton. Mr. McMillan states that the proposition is identical with what the noted Anaconda mine of Montana was when first taken hold of by capital. The formation on Jim creek is dolomite, porphyry, quartzite and gneiss. The copper ore is found in small vertical veins coming up through the dolomite. A cross vein of white quartz carrying a large percentage of lead and silver, and from $3 to $4 gold per ton, cuts through the dolomite and veins of copper ore. The copper is in the form of an oxide and glance.

COLORADO.

August Rische, the discoverer of the Little Pittsburg at Leadville in 1878, has made a new discovery in the New York group in the Alma district.

At Cripple Creek during June the chlorination mill at Gillett treated 1420 tons of $30 ore; the Brodie mill 1800 tons of $15 ore. The Florence mill is treating 150 tons daily, and it is expected that the new chlorination mill at Colorado City, with a capacity for 250 tons daily, will start up October 15th.

At Idaho Springs a contract has been let for sinking the Shafter shaft 600 feet.

A rich strike is reported in the Yankee Boy at Carson.

During July there were shipped to Denver smelters from Black Hawk station, Gilpin county, 216 cars aggregating 3456 tons of mineral—a large increase over last year.

At Telluride the Columbia-Menona is producing 100 tons of ore daily.

A large air compressor and other machinery is being put up by the Hector Mining Company to drive in the 4000-foot tunnel to intersect the vein of Montana Nos. 1 and 2.

The Smuggler-Union 50-stamp mill at Pandora is treating 5000 tons of low grade ore per month and shipping about 100 tons of high-grade ore in the same time.

Cripple Creek *Mail*: The Santa Rita, at the foot of Squaw mountain, is producing between 50 and 60 tons a week, the ore running from $120 to $200 a ton.

The Anaconda is now doing better than at any previous time in its life. An average of 25 tons of mill ore is now produced daily in addition to the unusually heavy shipment of a high smelting grade.

The output from the Ironclad for the past week was 30 tons of smelting and 50 of mill ore. This is in addition to the sensational ore that has been sacked.

The output of the Victor in July was practically the same as that of the month preceding, or, for that matter, for any thirty days during the past year. Supt. Cone, after getting enough out to pay expenses and the $20,000 monthly dividend, puts his miners on development work from that time on, and the reserves are now large.

The Iron mine at Rico was bonded by a Denver syndicate fifteen months ago and has produced on an average of forty tons per week since that time. A large ore body was recently encountered in the 150 foot level.

ARIZONA.

(Special Correspondence)—The Continental mine, twelve miles west of Globe, was located as a gold mine in 1880. While there was considerable ore in sight, in those days labor was high and supplies cost three times what they do now, and the ore on the surface only carried $5 to $6 in gold. N. L. Amster has bonded this property, sunk a shaft 50 feet and crosscut 55 feet, opening up a body of rich copper ore, carrying gold and silver. He is now driving a tunnel north 800 feet in length to crosscut the lode at a depth of 700 feet.

Globe, Arizona, Aug. 15th.

There are 50 men on the payroll of the Pearce mine.

At Tucson the United Globe Company is putting in a 150-ton smelter.

The Empire Smelting Company, at Crittenden, has decided to continue operations.

The Congress Gold Mining Company's new locomotive is a six-wheel switcher, oil burner, cylinders 17½x24 inches, and weighs 112,000 pounds.

Nogales *Oasis*: Some new and promising copper locations are reported to have been made in the Rosemont district.

At the old Peck mine, at one time a heavy producer and worked for thirty years, a new strike has been made fifty feet from the old lead.

An expert who recently took measurements in the Sun Dance and Silver Trail mines is quoted as saying that the properties have 12,000 tons of ore in sight, carrying an average value of $25—gold, silver and lead.

J. E. and J. G. Allen have given a bond to Charles McLloyd for five claims in Cherry Creek district for $20,000.

The Little Jessie mine has declared a dividend of $5000 out of a six weeks' run since resuming work.

The Planet-Saturn Company is preparing to work its Fool's Gulch property on a large scale. In addition to the 200,000 pounds of machinery, for which transportation has been contracted, the company has contracted for ten carloads of firebrick and fireclay from Phœnix and for twelve carloads of lumber and two carloads of tank material from California. They expect to have the mill up and in operation by November.

Mining News: A rich strike is reported to have been made in the Ripsey, sixty miles north of Tucson. At a depth of 500 feet a body of ore averaging six feet in width was found.

A survey has been completed of the group of mines owned by the Chicago Gold Mining and Reduction Company, in Cherry Creek district. A site has also been surveyed for a mill, and work will be commenced shortly in grading for it.

A new hoist has been ordered for the Jersey Lily mine, and will be placed in position upon its arrival.

MEXICO.

Nogales *Oasis*: The new triple hoisting engine at the Creston shaft has been in operation now about a month. The depth it can reach is 2500 feet. A foundation has been laid for a new air compressor, which will be one of the largest in the world.

Despite the recently published assertions that the great deal for purchase of the Amarillas and Grand Central mines at La Colorada had been closed, and that the other negotiations for the Creston, Colorado, Minas Prietas and other properties were drawing to a close, it seems nothing is definitely known as yet of the outcome, although every confidence seems felt that both deals will be completed. A representative of the intending purchasers remains in the camp, and to him a daily report is made of the output of bullion, concentrates, etc.

It is reported that Jesse Grant, formerly of Nogales, and son of U. S. Grant, together with an Eastern associate, have bought from Jose Vidal and Emiliano Ibarra, for $40,000, the Recompensa, Jesusita and Aguajito gold mines at Jacalitos, Lower California.

SOUTH AFRICA.

The South African *Mining Journal* gives an account of the successful treatment of slimes at the Robinson mine. A contract was made last year with the Rand Central Ore Co. to treat 500,000 tons, much of which is dry slimes, the accumulation from past workings. The treatment of the first 30,000 tons yielded about 6600 ounces of gold. In May, after everything was in good shape, 6623 tons yielded 1584 ounces. The old slimes contain some 30 per cent of sand, which, however, appears to be mostly wind drift from the residue dump. This sand is, however, separated by spitzkasten and treated separately. Taking May as a fair working month, the average bulk of slimes per diem is about 230 to 250 tons, of which about 130 to 150 tons are old slimes. The capacity of the plant is being increased and the monthly output will soon reach 9000 tons.

South African *Mining Journal*: "The inactivity which crept over the market at the end of last month has been intensified by the entire absence of business throughout the whole of this week. The termination of the half year was considered by some as being the cause of this cessation of dealings, but the absolute quietude which prevails now points to some other cause as the reason for the dullness. The spread of the native rising to Mashonaland has created a very uneasy feeling, and fears are openly expressed that risings may take place in consequence in other parts of the country. The advices from the north as to the punitive measures taken by the authorities are considered very unsatisfactory, as, until more active steps are taken to put down the risings, little hope can be anticipated of renewed buying setting in for either Charters or gold shares."

The report presented to the annual meeting of the East Rand Proprietary mines, limited, showed that the company owned 1252 claims.

Coast Industrial Notes.

—Washington State sawmills have quit buying logs "till after election."

—Boring for oil has been begun by the Pioneer Oil Co at San Bernardino, Cal.

—E. S. Babcock of San Diego proposes to erect large Roman baths in that city.

—It is again announced that active work will be begun on the Monterey & Fresno Railroad.

—The first through train from Stockton to Fresno over the S. F. & S. J. V. road arrived in Fresno on the 14th.

—The call for bids for supplies for Mare Island Navy Yard includes 242,000 feet of seasoned Oregon pine for ship deck plank.

—Creosoted lumber is now used in building and rebuilding piers at the city water front; $25 per M feet is the latest contract price.

—The North Pacific Coal Company announce that they will make regular shipments of coal from their Roslyn mines to San Francisco.

—The money necessary for a bonus for the proposed cold storage and power plant at Petaluma has been promised by the citizens.

—The owners of the Point Loma oil well near San Diego have stopped work to await contractors from Pennsylvania who are to sink it to 200 feet.

—Owing to the remarkably large runs of salmon in the Fraser river, it is claimed that this year's output of the canneries will be the largest in their history.

—Collector Wise is about to advertise for bids for furniture for the custom house, to cost about $8000. It is to be made to order, of quarter-sawed oak, oil finished.

—The Stockton, Cal., Gas and Electric Co. began this week to operate the electric car system of that city by power generated by an engine using natural gas, using 200 feet per hour.

—The Cook Power Co. at Santa Cruz, Cal., will duplicate its present plant, adding 250 H. P., and will build a 3,000,000-gallon reservoir. The line will shortly be extended to San Jose.

—Work of boring for oil has been commenced with the plant lately erected by Charles Sonntag and others of this city on the Josiah Allen ranch near Lafayette, in Contra Costa County.

—A proposition is being considered for bringing electric light and power 24 miles from the Little Sur to Pacific Grove and Monterey, to be used for electric railway and light systems.

—Henry A. Butters and his associates, said to be English capitalists who have made money in Africa, have made an offer to take over the Los Angeles Railway Co.'s stock and bonds. The amount involved is understood to be over $4,000,000.

—A cigar-shaped raft similar to that illustrated and described one year ago in these columns has been constructed by Capt. Robertson at Stella, Wash., and will be towed to this city next week. It contains nearly six million feet of lumber.

—Arrangements have been made by the San Francisco and San Joaquin Valley Railroad directors for the issuance of $6,000,000 in bonds, to be secured by a blanket mortgage on their line from Stockton to Bakersfield and all their rolling stock and terminal rights.

—The Brown's Valley, Yuba Co., Cal., irrigation system has been leased by F. W. Page. Pushed to the limit of its possibilities this means cheap power for the mines of that vicinity and sufficient electric generation to supply Marysville with light and power.

—The steamer Moana being built on the Clyde for the Union Steamship Company of New Zealand, to take the place of the Monowai next March, will be 360 feet in length and 44-foot beam with a capacity of 4700 tons or 1000 tons more than that of the Monowai and will have a maximum speed of 16½ knots.

—The Board of Prison Directors will be compelled to close the jute mills at San Quentin for two months, unless the State Board of Examiners will allow them to overdraw their accounts for August and September. There is a deficit of $13,240, caused by the failure to sell grain bags, of which 2,500,000 are now on hand.

—Arrangements for the consolidation of the two leading lighting companies of this city, the San Francisco Gas Light Company and the Edison Electric Light and Power Company are nearly completed. It is proposed to organize a new company to be known as the San Francisco Gas and Electric Company to take over the properties of the two old concerns.

—The Farmers' Loan and Trust Company has brought suit to foreclose a mortgage for $15,000,000, given by the Oregon Improvement Company in 1889 to secure the payment of $5,000,000, for which a mortgage had been given in 1880. The property involved includes 16,954 shares of the Seattle Coal and Transportation Company, the stock of the Columbia and Puget Sound Railroad and all other property owned by the defendants.

—The secretary of the Smithsonian Institute, Washington, sends word of a letter from the U. S. Legation at Pekin to the State Department, stating that the Pekin University has recently opened in one of its buildings a museum, which it is proposed to devote largely to the exhibition of foreign machinery and mechanical appliances, visited by people of the better classes, interested in acquiring some knowledge of foreign manufactures and inventions, and it is believed that it can be made an important means of advertising and introducing the products of American industry. The authorities of this museum would be glad to receive and exhibit working models, photographs, or drawings of machinery and invention, or specimens thereof, such as plows, ships, firearms, cannon, electricity machinery, cars, locomotives, windmills, looms, printing presses, wagons, engines, etc. Each exhibit which may be presented to them will be marked in Chinese with the name and address of the maker, together with description and price thereof if desired, and capable translators will explain their use to inquirers. The letter to the State Department says that this is a good opportunity for manufacturers in this country who wish to reach the Chinese market. Correspondence on the subject and articles for exhibition may be sent to the Pekin University, Pekin, China, or to C. H. Taft, 78 William street, New York. Under an arrangement with the I. M. Customs, all such articles will be admitted to China duty free.

Personal.

H. M. GORHAM has been appointed superintendent of the Savage mine, Virginia, Nev., to succeed the late General Keating.

THOS. F. EWING is the new manager of the Diamond Hill mine, Helena, Montana, recently purchased by a Glasgow syndicate.

JULIAN SONNTAG, secretary California Miners' Association, goes to Oroville next week to reorganize the Butte Co. Miners' Association.

THOMAS EWING of Oakland has returned from Montana, where he assisted in the sale of the Diamond Hill mine to a Scotch syndicate for $2,000,000.

O. S. CRESSEY, of Providence, R. I., who has been developing mining property in Shasta and Plumas counties returns home this week "till after the election."

SUPT. MELZER succeeds R. Recknagel in the management of the N. P. mine at Bourne, Or. The latter assumes the superintendency of a New Zealand mining property.

P. B. TOD, of Pietermaritzburg, one of the owners of the Jubilee mine in the Transvaal, has been examining the Bunker Hill mine in Ventura county for some English capitalists.

L. GILSON, who was called to England by the Exploration Company and has been connected with the management of its affairs in London during the absence of Hamilton Smith in America, is about to return to this city.

WILLIAM T. ST. AUBURN, formerly of the Niagara mine in Shasta county, who went to the Rhodesia mines in South Africa early last year for the Chartered Company, has returned to this city on his way to New Zealand, where he goes to inspect some mining properties for an English syndicate. Mr. St. Auburn narrowly escaped becoming a victim of the Matebeles.

JOSEPH MCGILLIVRAY has lately been in Spain, making an examination of some historic gravel mines in the Province of Leone, which were worked by the Romans some 2000 years ago and described at length by Pliny. They are extensive, the Romans having worked several thousand acres by drifting and by "booming" on a scale unknown in modern times. The mines have lain idle since the Romans quit them, and some French capitalists now propose to reopen them.

Recently Declared Mining Dividends.

Dalton & Lark of Utah, $12,500; payable August 15th.

Daly Mining Company, Utah, $37,500, payable September 1st.

The Isabella Company, of Cripple Creek, $22,500, payable August 18th.

Elkton Consolidated Mining Company, Cripple Creek, $10,000, payable August 20th.

The Anchoria-Leland of Colorado declared a dividend of 1 cent per share Aug. 7th.

The Le Roi mine, in the Kootenay district, declared a dividend of $25,000 on the 4th inst.

The Sacramento of Mercur, Utah, paid its first dividend amounting to $2000 on the 17th inst.

The Portland Gold Mining Company of Cripple Creek has declared a dividend of $30,000, making $240,000 for the first eight months of the calendar year.

The Byron N. White Company of Milwaukee, owners of the Slocan Star, in the Kootenay district, have declared a dividend of $100,000, payable Sept. 1st. This is the third dividend of the company and makes a total of $250,000 distributed.

Obituary.

PROF. J. D. WHITNEY died at New London, N. H., on the 19th inst., aged 77. He was a famous instructor and an authority on mineralogy and geology. He was appointed State Geologist of California in 1860, and the first few volumes of the MINING AND SCIENTIFIC PRESS contain much of his work. He began what was intended to be a thorough geological survey of this State and laid the foundations for topographical work. In '74 the legislature discontinued the work. Besides Prof. Whitney's contributions to this paper, he wrote several reports and minor works and published six volumes of his "Geological Survey of California." His name and fame as an earnest scientist will long survive in California. Mt. Whitney, the highest point in the State, named for him, will also perpetuate his memory.

"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colo.

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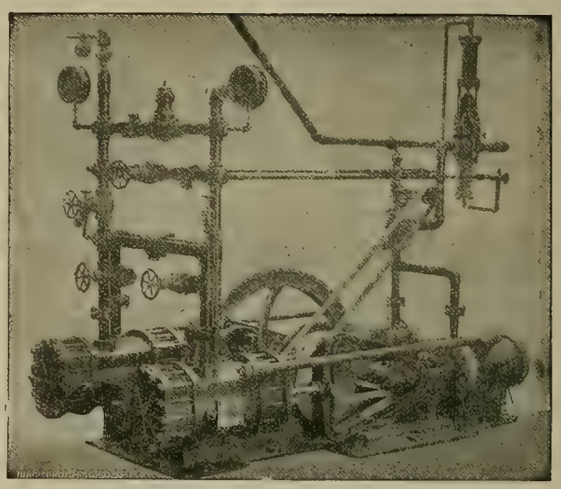

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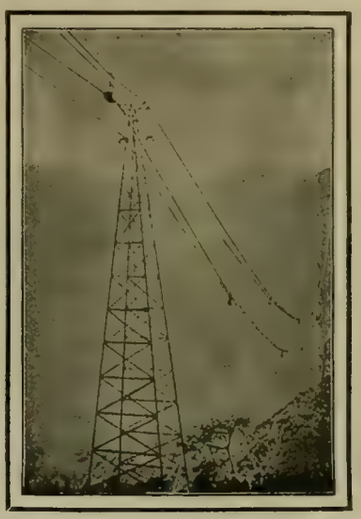

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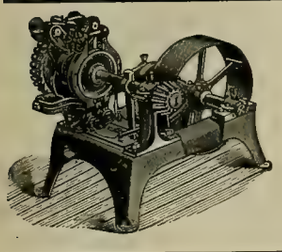

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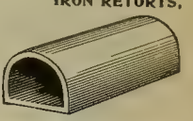

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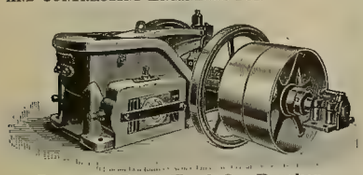

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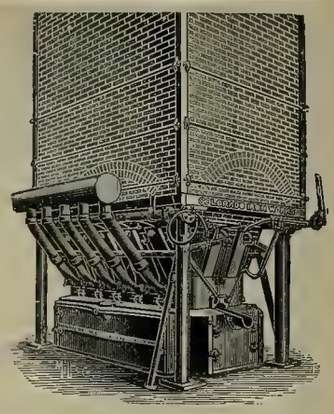

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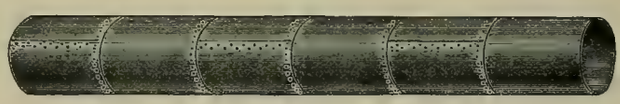

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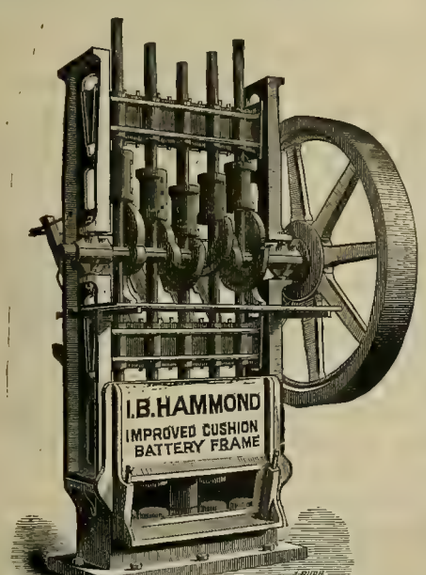

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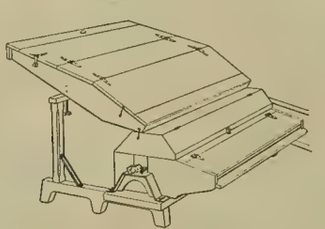

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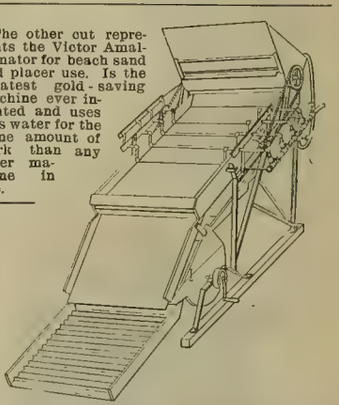

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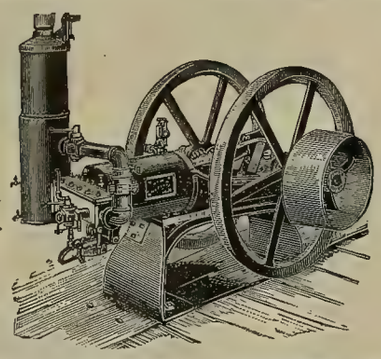

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Coal Gas, ten hours' run, 1000 feet	$2 00
Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c.	1 25
Coal Oil, ten hours' run, 7½ gallons @ 10c.	75
Crude Petroleum, asphaltum base, 16 gallons @ 3c	48
Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c	65

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon=21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¾c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

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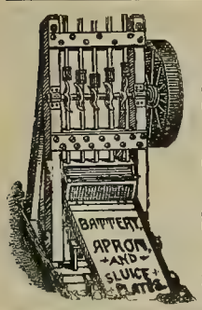

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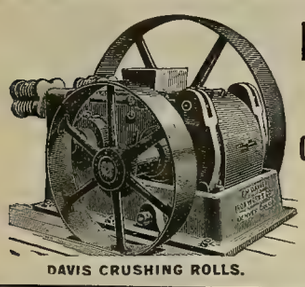
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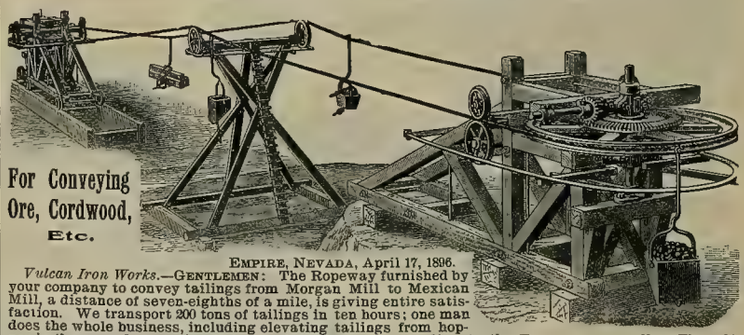

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Yours very truly, J. P. WOODBURY, Supt.

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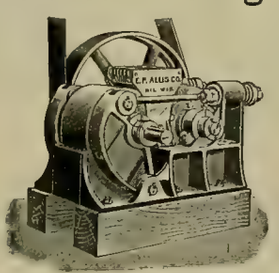

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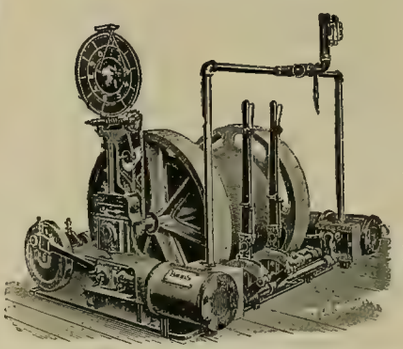

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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 20, 1896.

Jobbers state that the demand is confined largely to assortment buying, owing to the unsettled condition of affairs; but even these purchases foot up well at the end of the week. This would seem to indicate that the consumption has increased on this coast. In the writer's rounds he noticed considerable goods going out on orders for distant points, several of which have heretofore confined their buying largely to Eastern trade centers. The improvement in the market value of wheat so early in the harvest season is accepted as a favorable sign. The improvement is due to the Government's estimate that this year's crop in this country will be the smallest since 1893, which, taken in connection with the light stocks the world over, ought to favor the bull side. The gold mining industry continues to forge ahead, with a steady influx of miners to the more favored localities. Manufacturers do not report any material change in the general condition of their business.

The local money market works close, yet there does not appear to be any difficulty met by borrowers having first-class security. The demand for money is said to be slow, due to merchants not carrying heavy stocks and to a general trimming in expectation of a stringent market. Past experience has proven that when this spirit of caution prevails the expected does not come. Exchanges on the East and Europe favor buyers, causing quotations to be largely nominal. The money situation at New York seems to have changed for the better. While there is a good demand from the central-Western and Southern States for funds to move the crops, there is an increased offering of foreign money on 60 and 90 days—some with a gold clause and others without it; but lenders do not find as many ready takers as had been expected. The Canadian banks were, at last advices, in the market as lenders. The low rate of sterling exchange will admit of importation of gold from Europe.

New York Silver Prices.

NEW YORK, Aug. 20.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	31 1-16	67⅝
Saturday	31	67⅛
Monday	30⅞	67
Tuesday	30⅝	66¼
Wednesday	30⅜	65⅝
Thursday	30½	66⅛

	Copper.	Lead.	Iron.	Tin
Friday	10 85	2 70	10 25@12 50	13 30
Saturday	10 75	2 70	10 25@12 50	13 35
Monday	10 75	2 70	10 25@12 50	13 35
Tuesday	10 75	2 70	10 25@12 00	13 30
Wednesday	10 75	2 67½	10 25@12 00	13 25

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	Par
New York Telegraphic Transfer	Par
London Bankers' 60 days	$487½
London Merchants	$4.86
London Sight Bankers	$4.89
Refined Silver, per oz., 1000 fine	68½
Mexican Dollars	53@53½c

All exchanges are nominal.

SILVER.—The market dropped the past week in London to a lower figure than has ruled since 1894, whence it sold at 27 pence. At the decline there were heavy purchases both at home and abroad for large moneyed interests. Advices from the East note continued free shipments to Europe. In our market business is light, both for speculative and export account. Prices at the East and also abroad recovered slightly yesterday. The strengthening is said to be owing to reports that the Argentine Republic is negotiating a loan of $150,000,000 with an American syndicate. With this money it is expected that specie payments will be resumed, which, if done, will cause that country to take large quantities of silver.

A New York exchange of August 10th says: Pixley & Abell report shipments of silver from London to India, China and the East as follows for the year to date:

	India.	China.	Straits.	Total.
1896	£1,990,578	£574,413	£517,532	£3,082,523
1895	2,198,330	1,100,767	503,403	3,802,500

Pixley & Abell say that some holders of United States bonds have bought "calls" on silver, good till the end of the year, to protect themselves against loss in the event of free coinage.

MEXICAN DOLLARS.—Dealings are light with quotations largely nominal at 53@53½c.

COPPER.—While our market is quoted nominally unchanged, Eastern markets are easy at a decline. The lower prices are in sympathy with European advices and also some selling pressure by producers. The consumption in this country is light, but Europe continues to report a free consumption with an increase looked for in November.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The market is essentially unchanged.

Domestic trade, per flask	36 00

For export quotations are nominal, but less than for home.

ANTIMONY.—The demand is fair, with the market steady at 7¾@8⅛c in a jobbing way. New York mail advices quote 7⅞@7½c for Cookson's, 6½c for Hallett's and 6¼c for Japanese, from store.

LEAD.—The market at the East is lower than at any time in its history. This is said to be due to large stocks abroad, continued heavy offerings from producers and the limited demand which rules at this season of the year.

Pig	—	@	3 65
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—The market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs			$1 20
Drop, B and larger sizes,	"	"	1 45
Buck, Balls and Chilled, do.	"	"	1 45

TIN.—The decline in silver has affected, unfavorably, the market for pig tin. Eastern advices state that the demand is light, with tinplate makers well supplied for their nearby wants. Our market is weak at quotations.

Pig, per lb			14
Plate, I C coke, heavy, per box	$4 10	@	—
" " " light, "	4 00	@	—

BORAX.—There is a good shipping demand.

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	5¼
Concentrated, "	5⅝

POWDER.—The market is firm with a good demand ruling.

The market is quoted as follows

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

IRON.—While quotations in our market are reported unchanged, it is said the market at the East is unsettled, with furnace companies shutting down. Notwithstanding this, the stock is said to be large, with buyers finding favor from sellers.

Our market is quoted as follows:

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 50
Gartsherrie	21 50	23 50

Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing	20

COAL.—The demand is said to be improving slightly for both steam and domestic, but more particularly the former. This is due to crop moving and more demand for transportation facilities. The market remains unchanged; for forward shipments quotations are given quite lower than ever before known.

COKE.—The market is quoted as follows:

Gas Companies'	—	—	— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—It is reported that some cutting is indulged in. The home demand is slow, but the export movement is good. Export clearances from this port for the first seven months of the calendar year compare as follows in feet: 1896, 16,854,917; 1895, 9,095,875.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is dull and easy.

The market is quoted as follows:

Wire, carloads, basis per keg			$3 20
" jobbing, " "			3 30
Cut, carloads, " "			2 95
" jobbing, " "			3 05

Mining Share Market.

SAN FRANCISCO, Aug. 20, 1896.

The market eased off slightly last Friday and Saturday, which was followed by a setback of 10 per cent towards the close of Monday. This had the effect of drawing in considerable outside shares that were on a margin. Chollar sold down to $1.80, Potosi 83 cents, Con. Virginia $7.60, and the others in proportion, except the Gould & Curry shares, which, as usual, lost the most. Tuesday afternoon the market began to recover and by Wednesday afternoon there was a rally of 20 per cent from the low prices in the shares of the mines, excepting Con. Virginia, which advanced 15 per cent. Having ground on the Brunswick lode, the rest of the market strengthened somewhat in sympathy. It seems as if the muinstay of the market at present is the work being done on the Brunswick lode, with Chollar still the leader. So far the showing does not justify even current prices, except as an investment gamble, and this is always risky except to those who can afford to lose the invested money. It is to the 400-foot Hale & Norcross and Chollar level that mining men look for a verification of their prediction that the ore found on the 200-foot level and on the 300-foot level will improve with depth. If their opinion is proven correct, and the lode found wider and ore richer and stronger on the 400-foot level, then better prices than now rule are justified on an investment proposition; but if the lode should not come up to expectations, then present prices are far too high. Judging from the way Occidental has worked the bulls may get the worst of the bargain, although the ore in the lode of the latter mine below the 750-foot level is proving stronger and more in keeping with that in the Comstock lode. There can be no doubt that a strong bear feeling prevails on the street, and also with moneyed outside operators. They reason that conditions are against a deal until after the presidential election unless a body of ore is shown up, which they claim cannot be done. The bears also say that the close money market on this coast and at the East is against an upmove, as are the assessments levied, with more coming on. It is reported that the following companies will levy assessments within the next thirty days: Ophir, Gould & Curry, Union, Andes, Utah, Challenge, Yellow Jacket, Potosi, Alta, Occidental and Seg. Belcher. As for the correctness of this report the writer can not vouch, yet it is safe to say that it will prove correct within the next sixty days.

The activity in the New York market for railroad and industrial shares and in Chicago for wheat has drawn many operators in mining shares to those markets. From the Comstock lode the news is essentially unchanged; the work underway points to time and expenditure of money, yet each month puts the mines in better condition for working more advantageously in 1897 and 1898, when the business and finances of the country will have resumed their normal condition. In Alta they continue to find good ore while sinking on the Keystone vein. Overman is still raising a few tons of ore each week. In Seg. Belcher they have resumed extracting and raising ore while prosecuting work. Last week about 30 tons were raised that assayed a little over $20 a ton. The nature of the work in Belcher is still a profound secret; outside of the statement that ore is being raised no information is given out. In Crown Point work is continued on the same levels heretofore reported. There is nothing new from Yellow Jacket. There was a light increase in the number of tons raised by Confidence, but the assay was lower. When the powers that be are ready there should be quite a large increase in the quantity and grade of ore raised by Confidence, and Challenge also be brought to the front as an ore producer. Perhaps it is shares and not ore that is wanted. The joint Challenge, Confidence and Con. Imperial crossdrift is being pushed west as is crossdrift No. 3 in Con. Imperial. In Alpha they are still working in the 500-foot level; the formation is looking better. Work in long crossdrift in Bullion is continued to the west, with no particular change to report. In Potosi they are still prospecting in the 450-foot level without finding anything, so far as the public is advised, worthy of mention. In Chollar active work is continued in the 450-foot level. They raised 120 tons of ore last week assaying $32 a ton. This is an increase in quantity and also in grade, yet the public has no faith in it, for it may like the ore in the Savage disappear in some kind of mysterious way. In Hale & Norcross work is being done on the same levels and direction reported last week. A few tons of ore are raised each week. Work is being prosecuted in the 750-foot and 950-foot levels of Savage with nothing new reported. The joint Best & Belcher and Gould & Curry east crossdrift from the Banner shaft workings is being slowly pushed ahead. From Con. Virginia there is nothing new to report since last weeks' PRESS. Work is continued in the same levels given in that issue. Some seepage of water is reported in the 1000-foot level of Ophir's west workings. In the central tunnel workings the general prospects seem to have improved slightly. The work in Sierra Nevada, Union, Utah and Andes is in the same levels and direction given last week. The general formation is about the same.

From the Brunswick lode our advices continue to report favorable on the ore below the 750-foot level of Occidental. It has more the formation of a well-defined vein. Active exploiting work is being done in the levels heretofore published. In Chollar the south drift on the 200-foot level and that on the 300-foot level are being pushed ahead towards the Potosi line. It is stated that the latter level is still looking well. It is expected that towards the last of next week the winze in Hale & Norcross will have reached the 400-foot level, but drifting south will not be well under way for a few days, owing to some necessary work having to be done. Mining men stake their reputation on this level showing a decided improvement over the 300-foot level. They look for it in both Hale & Norcross and Chollar. The north drift in Hale & Norcross is being pushed forward to the Savage line. In the latter mine and also in Gould & Curry, Best & Belcher and Con. Virginia the work is about the same as heretofore reported. Some miners look for an improvement within the next thirty days.

From the Bodie district our advices are practically unchanged. Active dead and exploiting work is being done by Bodie, Mono, Bulwer and Standard.

The market opened this morning barely steady. After regular Call prices shaded off, but towards noon, under a demand for Best & Belcher and Con. Virginia, they strengthened. The advance in the latter two is based on an east crossdrift having been started in Con. Virginia on the 1650-foot level towards the Best & Belcher line. Four years ago a small deal was made in Best & Belcher, the shares selling up to $11, when they ran three crossdrifts to the east, but nothing of value was found. It is said that they were too high up to strike the ore, but at the present depth they expect to strike it; but what will be its value it is hard to say. The west Con. Virginia crossdrift was run into the ore body, which was found quite wide, but low grade; yet at the present depth it may be richer. It is purely a gamble—something or nothing. The market opened strong and slightly higher this afternoon. At this writing it looks as if Chollar will soon lose its leadership. This the MINING AND SCIENTIFIC PRESS predicted it would on the next upmove.

The following illustrates the changes of the week:

MINES.	Aug. 13.	Aug. 20.
Alpha	$ 06	.....
Alta Consolidated	.....	$ 07
Andes	30	.....
Belcher	.....	29
Best & Belcher	90	1 10
Bullion	.....	56
Challenge	14	08
Chollar	2 25	2 15
Confidence	91	.....
Consolidated California and Virginia	1 70	1 95
Consolidated New York	.....	.....
Crown Point	35	26
Exchequer	.....	.....
Gould & Curry	61	57
Hale & Norcross	1 25	1 25
Justice	.....	.....
Mexican	51	.....
Ophir	95	1 05
Overman	15	.....
Potosi	.....	92
Savage	60	55
Sierra Nevada	47	45
Union	40	.....
Utah	.....	.....
Yellow Jacket	.....	34

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.	Secretary.
Alpha Con M & M Co, Nev	17	10c	Aug 3	Sept 7..Sept 29	C E Elliott, 309 Montgomery
Anita G M Co, Cal	10	7c	July 20	Aug 25..Sept 15	L F Reichling, 404 Montgomery
Bullion Mining Co, Nev	42	10c	Aug 14	Sept 15..Oct 8	R R Grayson, 331 Pine
Best & Belcher M Co, Nev	60	25c	July 2	Aug 6..Aug 27	M Jaffe, 309 Montgomery
Belcher S M Co, Nev	53	25c	Aug 5	Sept 10..Sept 30	C L Perkins, Mills Building
Channel Bend M Co, Cal	3	5c	June 23	July 31..Aug 22	J P Langhorne, 39 Sutter
Confidence S M Co, Nev	27	30c	July 30	Sept 3..Sept 24	A S Groth, 414 California
Con Imperial M Co, Nev	37	1c	July 24	Aug 27..Sept 22	C L McCoy, Mills Building
Crown Point M Co, Nev	68	20c	Aug 18	Sept 23..Oct 13	J Newlands, Mills Building
Gold Bar Con M Co, Cal	4	2c	July 13	Aug 20..Sept 31	E C Godfrey, Crocker Bldg
Jamison M Co, Cal	8	5c	July 6	Sept 7..Sept 28	Sam W Cheyney, 120 Sutter
Marguerite G M & M Co, Cal	3	10c	June 18	July 28..Aug 28	Chas. Winters, 237 Twelfth
Reward G M Co, Cal	1	3c	Aug 8	Sept 14..Oct 5	J Stadtfeld, 309 Montgomery
Sierra S M Co, Nev	111	25c	Aug 7	Sept 11..Oct 1	E L Parker, 309 Montgomery

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Home G M Co, Cal	O E Johnson, 316 Front	Sept 1

San Francisco Stock Board Sales.

SAN FRANCISCO, August 20, 1896.

9:30 A. M. SESSION.

900 Belcher	29	100 H. & N.	1 25
1350 Best & Belcher	1 05	100 Julia	07
100 Bodie	56	100 Occidental	57
1500 Bullion	08	1100 Ophir	99
200 Chollar	2 10	100 Potosi	92
300 Con Cal & Va	1 85	200 Savage	55
1500 Con Imperial	02	100 Sierra Nevada	45
200 Exchequer	04	100 Yellow Jacket	34
300 Gould & Curry	55		

SECOND SESSION—2:30 P. M.

200 Ophir	1 05	300 Crown Point	26
300 Gould & Curry	57	100 Alta	07
750 Best & Belcher	1 10	150 N. G. & C	09
500 Con Cal & Va	1 95	300 Bodie	60
250 Chollar	2 15	100 Mono	19
400 Potosi	91		

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Assessment Notices.

CONSOLIDATED IMPERIAL MINING COMPANY. Location of principal place of business, San Francisco, California, location of works, Gold Hill Nevada.

Notice is hereby given, that at a meeting of the Board of Directors held on the 24th day of July, 1896, an assessment (No. 37) of One (1) Cent per share was levied upon the capital stock of the corporation payable immediately in United States gold coin to the Secretary at the office of the company, Room 35 third floor Mills Building corner of Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 27th day of August, 1896 will be delinquent and advertised for sale at public auction and, unless payment is made before, will be sold on TUESDAY, the 22d day of September, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors

C. L. McCOY, Secretary.

Office Room 35, Third Floor Mills Building corner Bush and Montgomery streets, San Francisco, California.

BELCHER SILVER MINING COMPANY. Location of principal place of business, San Francisco, California, location of works, Gold Hill, Storey county, Nevada

Notice is hereby given that at a meeting of the Board of Directors held on the 5th day of August 1896, an assessment (No. 35) of twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, room No 37, third floor, Mills Building N. E. corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of September, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on WEDNESDAY, the 30th day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors

C. L. PERKINS, Secretary.

Office Room 37, third floor, Mills Building, N. E. corner Bush and Montgomery streets, San Francisco, California.

JAMISON MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, on Little Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 8) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street San Francisco California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 31st day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office Room 50, 120 Sutter street, San Francisco, California.

POSTPONEMENT.

At a meeting of the Board of Directors o the Jamison Mining Company, held on the 22nd day of July, 1896, it was resolved that any stock upon which the assessment shall remain unpaid on the seventh day of September, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, September 28th, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

SAM W. CHEYNEY, Secretary.

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THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Walter Shackleford, in the Jack's Ranch Mine, near Meadow Valley, Plumas Co., to deposit tailings in an old pit; from J. F. Cowdery, in the Sacket's Gulch Claim, near St. Louis, Sierra Co., to deposit tailings in a ravine; and from Cadematori & Pelruno, in the Barnhardt Mine, near San Andreas, Calaveras Co., to deposit tailings in Grub Gulch, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on August 24th, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from George Beattie, in the Beattie and Parsons Mines, near Georgetown, El Dorado Co., to deposit tailings in Big Canyon Creek, and from Richard Phelan, in the Hilda Mine, near Sierra City, Sierra Co., to deposit tailings in a ravine, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on August 31st, 1896, at 1:30 P. M.

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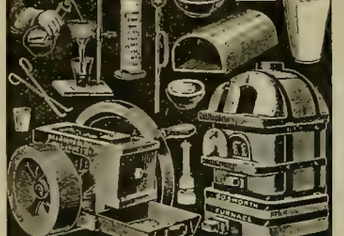

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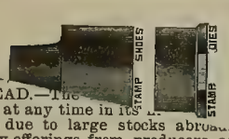

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No. 1886.—VOLUME LXXIII. Number 9. SAN FRANCISCO, SATURDAY, AUGUST 29, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

The Old Prospector.

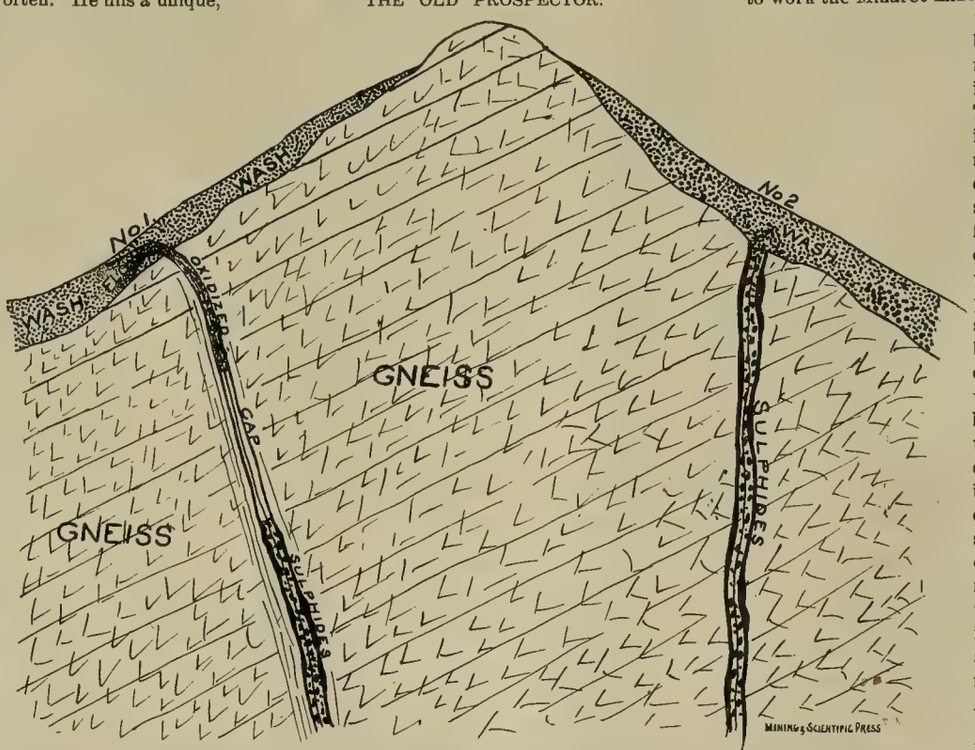
The prospector depicted on this page differs considerably from the miner, and still more from the mine developer. He is the pioneer; whatever his present work or prospect, he sees greater things in the future, and to him Hope always tells a flattering tale. Lacking in concentration, he distributes his work; usually devoid of business instinct, he works hard and dies poor. He loves variety and change, and is aways ready to drop "ounce diggin's" and investigate elsewhere. The class he represents has roamed over every available spot of mineral ground from Alaska to the Gulf of California, blazing the way, and those who follow ride in palace cars across the land he blazoned white with bones. What he does is for the love of it; he finds a pleasure in the pathless woods, a rapture on the lonely mountain side, a deep delight in tramping through the gulch, following up the mother vein that produced the bit of float. A divine discontent is a part of his makeup; when in Nevada he tells of going to California or Montana, "where there is grass, wood and water;" when in Oregon he most approves Arizona, "where one can get a prospect anywhere," and in the Black Hills of South Dakota he loudly proclaims the advantages of a prospector's life in Colorado. Travel and adventure are his enjoyment; the finding of a prospect is incidental.

A miner may sometimes be a prospector, but a prospector is rarely a miner; the hum-drum, every day work of mining is not to the prospector's fancy. He sees something bigger ahead and is going to strike it rich somewhere else. Sometimes his golden dreams are realized, but not often. He fills a unique, though important, place in the mining industry, and his occupation is largely a matter of temperament. Once the fever of prospecting gets in a man's blood, he rarely does anything else than continue his quest for hidden wealth till the great change that comes to all alike.

THE OLD PROSPECTOR.

Among the many differences between American and European mining methods is the manner of management and system of operation. In this country mining is mainly carried on by individuals or by close corporations making no reports, and furnishing no statistics as to income. In Great Britain and on the continent the business is almost entirely in the hands of companies. In Europe, as a rule, mining investors make a business of joining those companies, the dividends being their annual profit. Their losses in one company are expected to be made up by their gains in another. They usually stand ready to go into any mining scheme endorsed and guaranteed by men whom they believe to be responsible. After awhile they learn what to leave alone, with increasing safety for their investments. This country, as compared with Europe, is the individual system as compared with the company system. A good many things in the mining world are done differently in the old country from their manner of administration here. It has occurred, even in California, that a stockholder, for instance, has had difficulty in securing information as to the workings of the mine in which he held shares. In England it is a prison offense to hold back any news from a mine more than forty-eight hours. This law is enforced. All information must be truthful and must be immediately accessible by shareholders at the company's office. Any one, on payment of twenty-five cents at the proper office, can see in London exact up-to-date statements concerning the workings and expenses of any mine incorporated under British law. This country knows more about mining, but the old country can teach this considerable about the satisfactory handling of mining companies. It is to be said that in speaking of "American mining methods" the fact is recognized that there is no uniformity of methods in this country. For instance, there is a notable difference in the Colorado and California methods, caused somewhat by the non-assessable character of Colorado mining stock, and the more conservative character of mining operations in this State, the difference in this and other regards being interesting; but, in general, there is a notable difference between American and European mining systems in the manner of handling the property.

A proposition is on foot to work the large iron ore deposits of Shasta county, near the junction of the Pitt and McCloud rivers, by electric process. In Fresno there has been incorporated lately a company to work the Minaret mines within the Yosemite national grant, which contain, besides some of the precious minerals, large bodies of iron ore of good quality. The drawback to smelting iron ores on this coast has not been lack of quantity or quality, but cheap fuel. If some of the many processes for smelting iron ore by electricity which are being tried and for which much is promised shall be proven successful, there will be no better field for their application than in this State, where we have almost unlimited supplies of water in torrential streams within easy reach of the ore deposits for generating the required electricity. The consumption of iron on the coast is large enough to maintain an extensive industry. A local supply of cheap iron would do more than anything else to stimulate manufacturing on this coast. A great advantage here possessed is the climate. In many manufacturing-centers climate is often a serious drawback to continuous and economical work, while here, winter or summer, the weather can never interfere.



VEIN FORMATION PINE CREEK DISTRICT, COLORADO. (See page 173.)

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J. F. HALLORAN.....General Manager

San Francisco, August 29, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—The Old Prospector; Vein Formation Pine Creek District, Colorado, 169. Skeleton of Fish as Seen by Roentgen Ray, 174. Sand or Sediment Trap, 175.

EDITORIAL.—The Old Prospector; Differences Between American and European Mining Methods; To Work the Iron Ore Deposits of Shasta County, 169. Want of Sampling and Failure of Hydraulic Enterprises; State Work in Mining Interests; A New Mining Decision; A Law Passed in 1891, 170.

SCIENTIFIC PROGRESS.—Utilizing Culm Heaps; The Manufacture of Aluminum, 174.

ELECTRICAL PROGRESS.—The Future of the Roentgen Ray; Effects of the X Ray Upon the Human Body; How to Make Steel Hard, 174.

MECHANICAL PROGRESS.—Experiments in Firing a Boiler, 174. Sand or Sediment Trap, 175.

PRACTICAL INFORMATION.—Pipe Covering Heat Loss; Worthy of Emulation; A Monster Belt; A Fire-Proof Safe; The Largest Single Wood Pulp Plant, 175.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 178-9.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 186.

MISCELLANEOUS.—Concentrates, 171. Vein Walls, 172. The Accumulation of Amalgam on Copper Plates; Pine Creek District, Colorado, 173. California Mines and Miners, 176. Commercial Paragraphs; Recently Declared Mining Dividends; Coast Industrial Notes; Personal; Recent California Mining Incorporations, 180.

Want of Sampling and Failure of Hydraulic Enterprises.

A large proportion of the so-called big hydraulic mines in California, developed and operated up to the time that the anti-debris fight closed them down, were not paying investments. This was not due, to any great extent, to bad business management or want of knowledge of the best methods of working in vogue, but to the fact that there was not enough gold in the gravel to pay for working. With the owners of such mines it was the same old story as with the quartz mines upon which mills were built before pay ore was developed. People went to mining without mines.

In many cases expensive ditches were dug, hydraulic pipes put up, and extensive flumes and undercurrents built at expenditures of from fifty to a hundred and fifty thousand dollars for the working of large bodies of gravel, without any careful or systematic sampling or prospecting.

An expenditure of large sums in proving the value of gravel was seldom made. In fact, the only case recorded in which this was done on a scale in proportion at all to the magnitude of the undertaking was at the North Bloomfield, where $65,000 was spent to determine the value of the claims and the feasibility of working them.

Then the gravel miners knew much less than is now understood of the mode of occurrence of channels and pay streaks. Then the fact of finding pay gravel in one part of a large body was often enough to satisfy the owner that it was all equally as good. While the best energy and talents of the hydraulic mining engineers were devoted to developing the magnificent system of working gravel which is now the standard the world over, little or no attention was paid to the study of the nature of the gravel beds themselves.

All this is so much changed that now the first thing to be determined in any gravel proposition is the pay value and nature of the gravel. Much valuable information has been gathered on the nature of pay channels which materially assists in determining their probable location. Of late the running of long tunnels and drifts, or sinking many shafts at heavy expense, has been obviated in many cases by the use of well-borers, with which, at a comparatively small expense in most instances, the exact location, nature and value of channels may be determined, or in large bodies of gravel for hydraulicking the value of all that it is proposed to work may be estimated very closely. With gravel values properly determined, no enterprise of the kind need be undertaken without a reasonable certainty of success.

State Work in Mining Interests.

Some comment in last week's issue of the PRESS on the United States Geological Survey suggests a discussion of State work and mining. Of such work in relation to this industry we have in this country three distinct types. 1, Geological surveys by which purely geologic problems are elaborately discussed and little or no attention paid to mineral resources or the mining industries; 2, geological surveys in which the study and advancement of mineral resources are made prime objects; and 3, State mining bureaus by which special attention is paid to the actual mining processes.

The three branches of science from which these types grow are entirely distinct, and, although they successively blend into each other, with some minor digressions, all State work has heretofore followed one or the other of these main policies. It is worth while to consider the ends of such policies in their practical results.

Of the first type, the geological surveys of New York and Illinois are good examples. The State of New York has expended over half a million dollars on her geological survey, and in result has a great number of enormous volumes upon her fossils, and a few small volumes of more or less superficial descriptions of her natural resources. The State of Illinois, although not expending as large a sum, has received even less practical benefit in proportion.

Of the second class we have a number of good examples, of which the geological surveys of Pennsylvania, Arkansas and Missouri may be cited. The State of Arkansas, for instance, has published separate monographs upon the leading mineral resources of the State, such as manganese, iron, coal and marble. These monographs were each prepared and written by the best specialists in each particular branch, and written from a practical standpoint, are complete, clear and comprehensive. Although intended for local use only, they have become invaluable to all workers in those special branches. For, although the State interests are paramount, the value of these interests can only be determined when considered in their relation to like deposits elsewhere. The survey was completed in seven years with an annual expenditure of less than $18,000.

Of the third type the California State Mining Bureau is about the only example. The bureau has collected minerals and statistics of mining industries from year to year, usually over the same ground, and has published some valuable papers upon the mother lode, certain gravel mines and other matters of interest and value. The reports upon mining in the State have little permanent value, but the papers published, especially by the present directory, upon such special subjects as oil, gold milling, reduction processes and timbering are of a vastly higher order.

The application of any special policy is a matter to be adjusted to the locality. It must not be misunderstood that the value of pure science is in any way underestimated, for from the advancement of such is our progress in the more utilitarian arts due. But it is to be remembered that the taxpayer expects the best possible immediate results from his money, and the diversion of this money into profound paleontologic discussions or temporary makeshifts is hardly less than a betrayal of trust. It is to the policy of such a character that the lack of public support is largely due. The public has been disappointed, as in the case of the old California geological survey; support has been withdrawn and scientific work brought into disrepute.

The functions of the geological surveys of the second class and of the Mining Bureau are entirely different and equally important. The simple difference is that one deals with the occurrence of ores and the other with their reduction. That one blends into the other need hardly be mentioned.

That the result of any public work must depend upon the men chosen to direct it needs no repetition. To students of public work in mining interests it is evident on every hand that wherever good work has been accomplished it has been the result of two factors: First, the allowance of sufficient time, without change of support, policy or direction, to accomplish something; second, the employment of specialists whose training fits them for special investigation and whose reputations lie in the result of their work, and who receive credit for such work.

It may be suggested that in the case of the Mining Bureau such specialists cannot be secured for such amounts as the annual appropriation affords. But, as in the case of the Arkansas survey, it has been found that such men may be secured for but little aside from their expenses, provided that due credit is given for the results of their work. Their reward lies in the reputation gained.

The work of the Mining Bureau in the special lines undertaken needs every encouragement, for that recently accomplished is of permanent value. The elaboration of this feature would place California at the head in real practical results.

A New Mining Decision.

This week the State Supreme Court has made a new ruling on a point of interest to miners. In Trinity Co., Cal., the Altoona Quicksilver Mining Co. brought suit against the Integral Quicksilver Mining Co., the virtual issue being: can formal location of a claim be dispensed with and title to mining ground be successfully maintained by holding and working the property. A jury in the Superior Court of Trinity Co. found for the plaintiff. The judge set the verdict aside and made an order for a new trial. Plaintiff appealed. The Supreme Court affirms the action of the Trinity Co. judge. Following is a syllabus of the decision:

Altoona Quicksilver Mining Co., appellant; Integral Quicksilver Mining Co., respondent. Quiet title. Order granting new trial affirmed.

In an action to determine an adverse claim the act of Congress simply requires a contestant to bring such action as is authorized by the laws of the State to determine the right of possession; and such action when brought is governed and determined by the practice and rules of pleading there, irrespective of the act of Congress requiring the suit to be brought. The rights of the parties are to be entirely determined by the laws of the United States granting the right to enter upon mineral lands, and to extract metals therefrom and to acquire title thereto, but the suit must be tried in every respect as though no contest was pending in the land office of the United States in regard to the right to purchase the same. In such a case, therefore, it is error to instruct the jury to find against a plaintiff on the ground that it does not appear that the suit was begun within 30 days after the filing of plaintiff's claim in the land office.

In an action to quiet title a plaintiff is not bound to show the source of his title in his complaint, but to prove his right under a location it is incumbent upon him to prove that the locator is or was competent under the laws of the United States to take, hold and locate mineral land.

A verdict against the instruction of the court is a verdict against law.

The decision holds that where an individual or company takes possession of a claim, holds and works it for five years, as good a title is thus obtained as though a formal location of the property had been made. It is believed this is the first time this question has been judicially determined in this State.

The Supreme Court in this case made another ruling of considerable importance regarding what constitutes labor on a mining claim to comply with the law requiring the annual expenditure of $100 on an unpatented mining claim. The decision on this point is in effect that besides the ordinary work of development, in case the mine be idle, the amount paid a watchman for his services in taking care of the property may be applied to such expenditure and counted therein, provided that there exist on the property such improvements as necessitate the employment of a watchman.

Both decisions are very liberal in the interpretation of law, and it is possible that the precedent thus established may not be upheld by subsequent tribunals of equal jurisdiction.

ON March 31st, 1891, the California Legislature passed a law prescribing that when the required amount of annual labor or improvements—$100—is put on an unpatented mining claim, the owner shall within thirty days thereafter file with the county recorder an affidavit describing the labor performed, the improvement made and its value. The act further provides that failure to make such affidavit renders the mine open to relocation.

Concentrates.

UTAH now gives employment to 6000 miners.

A MOVEMENT is on foot to establish a mining exchange in London.

THE present daily output of the De Lamar, Nevada, mine is 260 tons.

NEARLY eleven million ounces of silver are in the San Francisco Mint.

MINERS' wages at Wardner, Idaho, have been reduced from $3.50 to $3 per day.

OSCEOLA, NEVADA, placer miners report good times and an average of $5 per day to the man.

THE Sutter Creek Electric Light Company have extended their wires to the Bellwether mine.

G. H. GILLETT of St. Paul, Minn., has bought the Sage Hen group of mines, Mercur, Utah, for $55,000.

EVIDENCE of prehistoric working of gold ore is reported from the Sisquoc river, Santa Barbara Co., Cal.

THE last regular monthly dividend of the Homestake mine, Black Hills, S. D., brought the total up to $5,962,500.

THE owners of the Two Brothers mine at Big Oak Flat, in Mariposa county, are arranging to erect a 10-stamp mill.

F. H. HILL of the Wheeler Hill group, near Coulterville, Mariposa county, has decided to put a 10-stamp mill on the property.

A DISCOVERY of rich copper ore is reported to have been made in Trinity county, about fourteen miles east of Trinity Center.

A BLOCK of ore weighing 75 pounds and valued at the rate of $5000 a ton was lately taken out of the Bland mine near Prescott, Arizona.

THIRTEEN location notices of mining claims for working the beds of the Yuba river in Yuba and Nevada counties were filed in one day last week.

SEATTLE, WASH., papers are advocating a proposition to build a large smelter at that place. There are already smelters at Everett and Tacoma, Wash.

THE Providence Company, Nevada City, Cal., will soon let a contract for the erection of new chlorination works to replace those destroyed by fire last week.

GIANT POWDER is being used at the Snake river, Idaho, placers to blow up the river bed to make room for the dredging boat, the water being unusually low.

THE Baltic Mining and Milling Company, at its meeting held in Placerville, Cal., last week, decided upon the erection of a mill on their property near Sly Park.

MR. FOSTER, the Minister of Mines of Victoria, Australia, has been deprecating the introduction of English capital and advocating sole reliance in local resources.

DURING 1895 Great Britain produced 189,652,562 tons of coal, the highest output on record. In the same year there were produced in the United States 186,903,315 tons.

THE Reglio-Electric Power Transmission Co. of Pachuca, Mexico, is about ready to bring in 1200 H. P. to that mining center from water falls twenty-five miles distant.

THE English syndicate which owns the Richmond mine near the Consumnes river, in Amador, intends putting in a large water-power hoist and building a 40-stamp mill soon.

IN Amador county alone it is estimated that there are over 2000 miners employed in the mines and that 300 stamps in the county are crushing over 20,000 tons of ore per month.

PART of the town of Gibbonsville, Idaho, is built on the edge of placer ground recently bought by T. Bruback for $100,000. He will organize a company and buy a large equipment.

UTAH papers report the finding of tin ore at Panguitch, and "a vein 18 feet wide has been traced nine miles." Upon scientific examination it will probably be found to be iron ore.

THE Government of New South Wales is being asked to devote a sum of £10,000 towards equipping and maintaining prospecting parties to search for minerals on behalf of the State.

PATENTED mines are assessable, the same as any other real property. In some counties the assessors value unpatented claims at $100, taough the legality of such proceeding is in doubt.

THE new mining town of Quigley, in Montana, has a population of 700 and has been built up so quickly that the inhabitants have not had time to find out in what county they are located.

RECENTLY a ranch on the Calaveras side of the Mokelumne river was sold for $25,000. There are two mining claims on the plan, and the purchase was made with a view to working the mines.

FOREST fires in the mining districts have been frequent of late, but the damage is not so large in a season now as formerly, owing to the familiarity of the people with methods for combatting them.

THE boom in the organization of new mining companies has declined in Colorado. It continues in Washington State, where a daily average of twelve new mining companies file articles of incorporation at Olympia.

FOR the third time the receiver of the Keystone mine, Lincoln Co., Nevada, advertises the property for sale. This time he says it will surely be bought by New York people, who will reorganize and develop the property.

THOMAS EWING of Oakland, manager of the Diamond Hill mines in Montana, which were lately purchased for $2,000,000 by a Scotch syndicate, is preparing to place an order in this city for a 150-stamp mill for that company.

THE Diestlehorst dredger, which has lately begun operations in the Klamath river near Quigley's, is being run night and day by five men, and it is claimed raises 600 cubic yards of earth a day, yielding 10 cents per yard.

BUTTE, MONTANA, is probably the liveliest mining town in America. The pay roll approximates a million dollars a month. The lowest wages are $3 a day, miners receiving $3.50. Butte has almost 40,000 population.

PROSPECTORS in India are not overly encouraged over the newly promulgated rule that they are not allowed to turn up the ground beyond a depth of two feet, which is not conducive to satisfactory development.

THE recent sale by the Calumet & Hecla (Mich.) Mining Co. of 20,000 tons of old machinery for scrap is commented on in some quarters as needless extravagance. To us it seems like true economy. Economy in mining, as in everything else, is the judicious expenditure of money. Wherever an obsolescent machine can be replaced by one that will produce better results, such replacement is a proper business investment. The fact that the Calumet & Hecla has to date paid dividends aggregating $45,850,000 is pretty good evidence of its managers' sagacity.

A PECULIARITY of Colorado mining stock is that it is non-assessable, though this is not absolute. The stock of the Geyser Mining Co. at Silver Cliff, Col., is assessable. On this property is the deepest mining shaft in Colorado—2150 feet.

THE closing down of the French syndicate's hydraulic mines at Minersville, Trinity county, is only temporary, and on account of the usual giving out of water in summer. They will continue prospecting, developing and fitting up for next season's run.

THE British Northwest Gold Mining Co. has been organized by Seattle and English capitalists, to take over and work the Fishback, Maud and other Quesnelle properties in the Cariboo district, and is said to be the biggest placer concern in British Columbia.

A LARGE number of mining locations have lately been filed in Yreka, Siskiyou Co., showing that there are more prospectors than usual in the mountains. The comparative inaccessibility of the mines in the mountains to the west has long been a drawback to the development of that county.

THE old Crown Point mine, Virginia, Nev., closed down indefinitely last Saturday evening. It was of this mine and the Kentuck that Senator Jones of Nevada, after his unsuccessful fight for Lieutenant-Governor of this State in 1866, became superintendent, and there he laid the foundation of his first great fortune.

HEINRICH, HEDGES & BROWN have bought the property of the San Jose Mining Co., Egan canyon, Cherry creek, Nevada, for $30,000, and will put in a cyanide plant. This property was formerly superintended by Gen. W. S. Rosecrans, when owned and worked by the Donohoe-Kelly Bank of this city, but has been idle for many years.

AT a meeting of business men in Leadville, Colorado, last Saturday, held to devise means to end the strike, a committee was appointed to endeavor to effect a compromise between the strikers and mine owners. It is understood the latter offer to pay $3 per day for every calendar month in which silver averages 75 cents per ounce.

GEORGE B. MCAULEY, secretary of the Cariboo Mining Company, was robbed by a highwayman out of $12,000 in bullion belonging to his company last week. It has become a custom among some of the men who carry bullion in this State to have on hand, ready to hand out of buckboard or buggy, a bogus bar, but, for some reason or another, they do not seem to be held up often.

THE output of borax of the American Company for the three years ending August 31st was: 1893, 7,408,542 pounds; 1894, 7,341,832; 1895, 9,570,849. California's '95 product of borax was about the same as that of '94—11,750,000 pounds. Last year Nevada produced 1,500,000 pounds. The price fell from seven to five cents per pound, a reduction in the tariff opening to us "the markets of the world."

THERE is always more interest shown in the discovery of large nuggets in gravel mines than small gold, but it would probably interest the average gravel miner to know that in Colorado are extensive deposits where there is never found a piece of gold as large as a pin-head, and where, of the average gold, it takes over 1000 pieces to make one cent, or 100,000 nuggets to a dollar. Yet there are enough of them to pay for working the gravel.

THE production of copper from the mines of the United States for the month of July amounted to 37,175,000 pounds, against 35,896,000 pounds in June, an increase of 1,279,000 pounds; the production of foreign mines for July amounted to 16,472,000, against 15,680,000 for the preceding month, an increase of 792,000 pounds; exports from the United States during July amounted to 24,382,400, against 21,952,000 in June, an increase of 2,430,400 pounds.

LEAD is dropping in price to such an extent that the lead-producing mines in Utah and elsewhere seriously contemplate shutting down. With that metal at $2.50 there is little possible margin of profit. The matter is also one of consequence to mines producing high-grade siliceous ores, which need lead as a flux in smelting. Never in the history of mining was lead so low as this week. What a difference between now and '64, when the writer remembers receiving $210 a ton for lead ore on the dump!

IN Cochise county, Arizona, artesian wells are being sunk and water found that will be utilized for mining purposes as well as stock. So near Randsburg, Cal., more water is being found than was at first expected for milling purposes. San Bernardino where no water was supposed to exist flourishes with orchards through the development of water in apparently desert places, and there is no reason to suppose that the same may not be done in the neighborhood of many mines in the southern part of this State, Arizona and New Mexico. Even if the water from these wells is not available for actual working of mills it will be for agriculture and the growing of home produce for the miners.

THE registration of voters in Shasta county shows an increase in the population of that county of over 40 per cent during the past two years, and in Tuolumne of 30 per cent, all due to the development of mines in those counties. Similar showings are made by other mining counties, and in none of them is there complaint of hard times or want of money. This increase of population is not made up at all of paupers or silurians, but of "honest miners" who have ever in California been the peers of any of its citizens. Towns like Weaverville, Yreka, Downieville, Placerville, and many others in the mining districts, are lighted by electricity and show many other signs of prosperity and progress.

THE newspapers published in the mining districts of California show freedom from the "booming" habit. With a few exceptions the journals of the State in these districts show their resources as they really are, and cannot be too highly commended for this. They know enough about mining to realize that a good mine may be given a bad reputation by its owner claiming too much for it; and so with a district. It is easier now to publish a big story of a marvelous find, that has little foundation, away from home than in these guardians of the welfare of the miners. It is sometimes a complaint of investors in mines that they cannot get reliable information from the newspapers of mining districts where the papers credit bonanzas to every location or hole in the ground. The fact that mining in California is conducted as a commercia undertaking, like any other business with as good average prospects of success, no doubt gives the tone to the press.

FRANCIS HEURTEVANT, a French capitalist who has made extensive purchases of gravel mines on the Trinity river below Junction City, has brought suit against J. D. C. Day and Theodore Begel, alleging that some of the property purchased from them was "salted." He alleges that the sampling of the mine showed $8000 to an acre; that it produced only $2000, and that the defendants had placed gold from other mines in the gravel. It is not often of late years that charges of "salting" have been made in California, but the habit still exists, and it might not be a bad plan for the Legislature to pass a law similar to that of Colorado, mentioned in our last issue, in which a severe punishment is provided.

THE second Raad or lower house at Pretoria has passed an act which, if it passes the first Raad and becomes a law, will make it unlawful to sell or give liquor to natives on proclaimed gold fields. President Kruger advises postponement until next year, claiming that it would be unfair to cancel all native liquor licenses at a stroke, and it is doubtful whether the bill will pass the first Raad. Public opinion and the mining industry support the action taken in the lower house. In fact, the question of liquor traffic among the natives has become a serious one with the mine owners; and if the upper house fails to give the desired relief, there will be engendered considerable hard feeling toward the Government. At a late meeting of the Mine Managers' Association some of the members claimed that native labor would become 15 or 20 per cent more effective if the use of alcohol were prohibited.

AN improved bit to be used with an ordinary well-boring outfit for sampling gravel mines, which was made by E. H. Benjamin of this city, has done considerable to bring that method of examining gravel into favor. Instead of the usual bit used, which dragged and scraped, Mr. Benjamin made his with longer point, thrown forward, so that it would cut instead of scrape. The bit takes on the shape of a plowshare, and the gravel may be brought up in large quantities for sampling. About this is fastened a "barrel" of sheet iron. Whenever hard rock was struck an ordinary churn drill was substituted. Mr. Benjamin states that in sinking holes on the Old River mine in Placer county, to locate the channel, two-fifths of a cubic yard would be brought up each time. The total cost of the well-boring outfit need not exceed about $200. While with the bit generally used in well-boring but 25 feet per day could be dug, with this it is claimed that 70 feet of holes may be sunk without any extra labor. The value of this method in locating channels or sampling gravel to be hydraulicked will be apparent to miners. The old method of digging shafts or running tunnels or drifts was not only very expensive, but at best could give no ideas of values over large areas. On the Old River mine 120 holes were sunk in locating the channel at an expense of not over $600.

MINING is not nearly as dangerous an occupation as railroading, according to the statistics gathered. The Interstate Commission's report for the year ending June 30, 1895, shows that the railroads of the United States gave employment to 785,034 persons during the year, an increase of 5,426 over the previous year. During the year there were 1,811 employes killed and 25,696 injured, a decrease of 12 in the number killed and an increase of 2,274 in the number injured. One employe was killed for each 433 employed, and 1 was injured for each 31 employed. If we leave out officials, clerks, telegraphers and take only the trainmen whose service is upon trains, the ratio is 1 killed for each 155 in service and 1 injured for each 11 in service. These may be compared with the men employed in mines. The Mine Inspector's statistics of Pennsylvania show that in the anthracite region, the most dangerous mining field, there were 143,610 employes. Of these 422 were killed and 1,120 injured, or 1 killed to 340 employed and 1 injured to 128 employed. In the bituminous fields of Pennsylvania 84,904 were employed, of which 155 were killed and 419 injured, or 1 death to 548 employes and 1 employe injured for each 203 employed. Taking the two classes together we have of 228,514 men employed 557 were killed and 1,539 injured, or 1 fatality to 410 employes and 1 case of injury to 148 employes. Compared with the statistics of railroad accidents, it appears that railroading is about three times as dangerous as coal mining, and coal mining in Pennsylvania is admittedly the most dangerous of all mining in this country. In Great Britain during 1895 the death rate was 1 in 600 for underground workers in coal mines, 1 in 1,140 for the surface workers, and for underground workers in metalliferous mines 1 in 423.

FROM David T. Day, chief of Division of Mineral Resources, is received a chart showing in detail the aggregate quantity and value of the mineral products of the United States for the calendar years 1886 to 1895, inclusive. This chart contains the revised figures of the director of the Mint as to the gold production of this country in '95, which was 2,254,760 ounces; calculating the value at $20.6718 per troy ounce gives an aggregate of $46,610,000. This is the largest production of any country for that year, and California's contribution is the largest of any of the States—$15,334,317.69. The increase in gold production is illustrated by the figures for '92—$33,000,000. During '95, according to the chart, the silver yield of the U. S. was 55,737,000 ounces, which at $1.2929 per ounce would mean $72,051,000. The greatest silver yield of this country for the last ten years was in '92—63,500,000 ounces. The greatest proportional increase is shown in copper. In '86 the quantity of copper produced in this country was 161,235,381 pounds, valued at $16,527,651; in '95 there were produced 381,106,868 pounds, worth $38,682,347. Looking at the admirably arranged figures, those referring to pig iron are suggestive from an industrial standpoint, showing an increase in production and a decrease in value. In 1890 this country produced 9,202,703 long tons (2240 pounds each) of pig iron, valued at $151,200,410; in '95 were produced 9,446,308 long tons, worth $105,198,550—a shrinkage in value just representing the value of the total gold output of the country for last year. In connection with the revised figures of the director of the Mint as now received, giving the value of the gold yield of this country for the calendar year '95 as $46,610,000, it is in order to quote the following from "Concentrates" on page 43, of the issue of the MINING AND SCIENTIFIC PRESS of Jan. 18th, '96: "According to the estimate of the director of the Mint, the gold yield of this nation for '95 was $52,614,000, which, however, is probably about $6,000,000 too great." That is, eighteen days after the close of the year, this paper figured the gold yield for '95 at $46,614,000, and now the director of the Mint makes our figures virtually coincide with his.

Vein Walls.*

NUMBER II.

By T. A. RICKARD, State Geologist of Colorado.

(*Condensed.*)

Where ore is absent in the Seven-Thirty mine the walls are apt to be particularly well defined; and when there is any thickness of rich silver-bearing mineral present the walls are scarcely to be distinguished, and the rock is hard to break, because it is destitute of convenient partings. The large veins carrying gouge are found to be uniformly poor, except where they meet the very narrow rich streaks which constitute the resource of the property. The Seven-Thirty vein proper is only 2½ inches thick, but it is very persistent through the midst of hard crystalline rocks, and it has for twenty years proved very productive.

In many mines one vein only is exploited, and crosscutting the country in search of parallel lodes is entirely neglected. In others a crosscut is stopped as soon as it reaches the further wall of the particular vein it was started to reach. Both these unwise practices are founded upon a misconception of lode structure, due to a narrow interpretation of the early teachings of economic geology, which lays a misleading emphasis upon the definition and clean-cut boundaries of so-called "true fissure veins." The fact is, as daily observation proves, that there are walls within walls, and walls beyond walls; and that to follow closely any particular hard, smooth rock surface, with the idea that it is the utmost limit of ore occurrence in any particular mine, is to be blind to the realities of geological structure.

In the Canton mine, near Waipori, New Zealand, those who were working the mine had little comprehension of the formation, particularly of its essential lack of definition, and, while admitting that there were several "false hanging walls," insisted that there was only one foot wall, which was stated to be of a different kind of rock, and exceptionally hard. On examination I found that the rock of the supposed foot wall was similar to that of the rest of the gold-bearing country forming the lode, and on a sample of it being crushed and tested in a prospector's pan it was discovered to be richer than that which was being actually mined. It was scarcely necessary after that to insist that a crosscut should be made into the foot wall.

In the Gold Cliff mine, Angel's Camp, Calaveras county, Cal., near the well-known Utica mine, the ore channel consists of a country rock traversed by cross veins of white gold-bearing quartz. The country rock is a greenish gray augite schist (probably at one time a diabase), carrying coarse pyrite near the gold quartz.

There are "walls" ad infinitum. Each cuts off the quartz seams, which occur again on the further side and extend to the next "wall," where they are terminated as before, and so on. A certain portion, 20 to 30 feet in width, of this channel of country is rich enough to work, and is sent to the mill, but the poorer material which lies beyond it has an identical geological structure. Of course, in such a case the "main walls" will depend for their determination upon commercial rather than geological conditions.

Another case in point is presented at the Cashier mine, in Summit county, Col., in which the lode consists of altered quartz felsite, rendered porphyritic by large crystals of feldspar. It is spoken of as a vein 45 feet wide, having a hanging wall of porphyry and a foot wall of lime. The ore is said to be penetrated by dykes of porphyry. The facts are really these: A certain width of quartz felsite within the neighborhood of its contact with the limestone has been acted upon by mineral solutions which probably came up along that contact. There are no walls, the porphyry of the hanging being simply the rock of the ore channel in a less altered condition. The feldspar of the lode rock has been leached out. In the cavities, now partially filled with crystalline quartz, iron oxide and gold, there can be distinguished the outlines of the large (½ to 1½ inches) crystals of orthoclase, whose removal made the rock porous to circulating waters. The mineralization is indicated by the softening and reddening of the porphyry and is most marked along the joints, especially where they intersect. There are occasional portions of the rock comparatively unaffected by the leaching agencies, and therefore appearing as hard, unstained nuclei amid a mass of softer reddish ore. It is these that are locally termed "horses" and "dikes" of. porphyry.

Lodes subdivided by partings parallel to their outer walls often resemble twin veins such as are actually formed by the temporary parallelism of two distinct fissures traveling together after they have united. Such a case is shown in the union of the Old and New Castletown veins as seen in the north face of the 500-foot level of the Drum Lummon mine, Marysville, Mont. The country is clay slate. There is no selvage on any of the three walls, but each is marked by soft, crushed and foliated slate.

The generous lodes of silver-bearing copper ore which at Butte, Mont., penetrate the granite are frequently marked by a brecciation of the encasing country and are accompanied by a mineralization of the granite far beyond the walls or limits of workable ore. In the 300-foot level of the Gagnon mine, 374 feet west of the main shaft, a crosscut shows that the lode channel extends 30 feet north of the supposed foot wall, the enclosed granite being broken and mineralized. Beyond this line the country ceases to be shattered and is no longer impregnated with ore, but is comparatively fresh, hard, normal granite, with a blocky fracture. This outer foot wall of the lode channel is marked by the occurrence of some ore streaks and an accompaniment of seams of clay. The foot wall country has a noticeable number of slips or joint planes. It is separated from the lode channel by a thick layer of tough black clay. Then comes a zone of kaolinized granitic filling traversed by irregular veins of zinc blende and pyrite. Another clay seam divides this part of the section from a band of mixed white quartz and granitic filling, followed by altered mineralized granite, whose southern limit is a third seam of black clay. Then comes crushed, brecciated granite, diversified by quartz and occasional evidences of ore, which extends to the main pay vein (on the hanging) which has the workable part of the deposit.

In mines of this character the geologist may determine the existence of the lode far beyond the limits of workable ore; but the miner will rightly distinguish between what is mineralized country too poor to exploit and the concentrated mineral which will yield a profit.

Where a vein cuts across sedimentary rocks the dislocation may be looked for along the bedding planes. Such is the case at Rico, Col., in the Enterprise mine, where the breast of a stope will show a vein traversed by a fracture at right angles to its walls, and apparently unaccompanied by any dislocation, but further examination will frequently show that there has been a displacement of the country along the dip of the sandstone and limestone beds, in the strike of the vein itself.

When Werner and his school attributed the filling of veins to the agency of descending waters the existence of open fissures at the time of vein formation was conceivable, because the theory necessarily restricted such operations to the vicinity of the surface. But the acceptance of ascending waters as the main agents of ore deposition, and the recognition of the conditions possible to the formation of large masses of sulphides, at once transferred the laboratory of ore formation to a deeper horizon; and the suggestion that veins were filled by the deposition of layers of mineral precipitated from waters passing upward along fissures which were kept wide open during such time as was required for crystalline growth to choke them with ore was immediately ridiculed by the miner, because his daily experience taught him that the vein, once deprived of its filling, did not remain open, but was inevitably closed by the surrounding rock. In many cases, in the absence of artificial means of support, his mine workings collapsed, so that where there was once a level wide enough for a man to walk through there came to be only a seam of mud enclosed in shattered rock.

Despite the miner's objection, however, there is evidence that fissures do sometimes occcur, which have been sufficiently open to permit the tumbling in of large pieces of rock. Such an occurrence was observed in connection with certain faults which disturb the Virginie lode at Roure, near Pontgibaud, France, where, at a depth of 164 feet from the surface, a fault fissure encloses a mass of clayey material containing boulders of black, soft and porous rock, which can be identified as pieces of scoriaceous lava. No such rock occurred elsewhere underground; and the boulders must have been portions of the Quarternary alluvium which covered the outcrop of the lode, and fell into it at the time of its intersection by an open fissure, which long post dated the formation of the ore vein itself. The mines are in a district which has frequently been subjected to earthquakes, and in the heart of a region formerly the scene of great volcanic activity.

We must be careful, however, to distinguish between the formation of cavities within the zone of the vadose circulation and their existence in "the deep," where sulphide ores have their origin.

Two examples may be quoted. The first is in the stopes above the 800-foot level in the Indiana mine, Gilpin county, Col. The lode, which is the California vein, in its extension westward from the Hidden Treasure mine is about 2 feet wide. There is no parting or selvage separating it from the country. The latter is a quartz-feldspar rock, best described as granulite. Near the lode it is seamed and sprinkled with pyrite, and sufficiently gold-bearing to be sent to the stamp mill. The main pay streak is almost entirely composed of black zinc blende which, by candle light underground, contrasts strongly with its encasement of light gray country. The upper part of the vein, in this particular stope, consists of a breccia of zinc blende, with an occasional spattering of wall rock, the latter so disintegrated as to resemble gravel. At one point there is a shred of wall rock lying across the vein. Lower down there are a number of cavities or vugs scattered among angular fragments of ore. It all looks loose, like an old stope filled with ore that has been mined, but the material is hard and difficult to detach without explosives. Lower again, the vein loses both its cavernous and its brecciated character, and consists of a compact body of blende. It may be added that, even where the brecciation is most evident, both walls are lined with a few inches of ore unbroken and firmly attached to the wall rock into which it gradates. The vugs, when first found, were full of gas (CO_2, probably) and the miners suffered from bad air when working in ground of this character. The pieces of blende are held together by a siliceous cement, which also covers each fragment in the form of a gray-blue chalcedonic coating. It is almost certain that the cavities above described contained water, previous to the drainage of the ground by the penetration of the level underneath.

(*To be Continued.*)

* Trans. Am. Inst. M. E., February, '96, meeting.

Importers of English Patent Plow Steel Cable.
—MANUFACTURERS OF—
PATENT STEEL SNATCH BLOCKS;
PATENT STEEL DRAFT HOOKS.

—OFFICE OF—
CALIFORNIA
Stump Puller.
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82 & 84 ZOE STREET,
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A. BARNES, Manager.

MECHANICS' INSTITUTE INDUSTRIAL EXHIBITION SAN FRANCISCO.
PREMIUM
AWARDED TO
GEO. HARVEY
California
Stump Puller.

San Francisco, Aug. 15th, *1896.*

To the General Manager of the
Mining and Scientific Press.

Dear Sir:-

The result of my advertising in the Mining and Scientific Press has surpassed my expectation; I have sold several Stump Pullers through its influence.

I shall take pleasure in renewing my ad in your paper as soon as cuts are ready.

Yours very truly,

A. Barnes

Manager.

The Accumulation of Amalgam on Copper Plates.*

NUMBER II.

Communications in discussion of the paper of MR. R. T. BAYLISS, presented at the Pittsburg meeting, February, 1896.

Arthur L. Collins, Central City, Col.: The interesting paper of Mr. Bayliss recalls a recent experience of my own, which may be useful as a comparison.

We had occasion recently to rebuild the Hidden Treasure mill, of 75 stamps, at Black Hawk, Col., after nearly ten years of service This mill also belongs to an English company—the California M. & M. Co., Ltd.—operating the California mine, Gilpin county, Col. It is a typical Colorado mill, with roomy mortars, high drop and deep discharge; two inside plates, and an apron plate 54 inches wide by 12 feet long, being used for each battery of five stamps. The ores treated are soft, consisting of quartz and decomposed feldspar, carrying from 10 to 20 per cent of sulphides, mainly iron pyrites and zinc blende. The stamping is very fine, a slot screen equivalent to a 50 or 60-mesh being used. The ore milled yields on an average 6 dwt. of crude bullion per ton, 740 fine in gold and 220 in silver, the balance being mainly copper. But, as large amounts of custom ore are treated at the mill, this fineness varies within wide limits.

On rebuilding the mill, each plate was thoroughly scoured for several hours with sharp sand from the tailings, hot water and quicksilver. The loosened amalgam could then be removed (after washing off the sand with hot water) with a rubber scraper in the ordinary way, leaving the plate with a good, soft surface of amalgam, in excellent condition for further use. In this way an average of $100 was saved from each plate, the crude bullion carrying the ordinary proportion of gold and silver, with a slight increase in the copper, from the scouring of the plate.

To ascertain the value still left on the coppers, five plates were shipped to the Argo smelting works, realizing an average of $150 each, or about 8 ounces of fine gold per plate. Thus, after ten years of constant use, and after about as much ore had passed over it as in the Montana case, reported by Mr. Bayliss, each plate yielded only $250, instead of over $8000.

It is only a rich corporation like the Montana Mining Company, Limited, which can afford to keep $8000 locked up idly on each plate, or $80,000 in a mill of 50 stamps. Without considering interest on so large a sum, possible losses from theft or fire, or even from the abrasion or peeling off of parts of the amalgam scale, should alone suggest some need for improvement. Such practice needs the strongest justification of absolute necessity or direct advantage—neither of which, I venture to think, can be shown for it.

In this district, where over half of the 500 or 600 stamps of the camp are run on small lots of custom ore, on each of which a complete clean-up has to be made, it would be impossible to run in that way. The whole difference probably lies in the mode of cleaning the plates, and especially in the use of the steel scraper. This much-abused tool can doubtless be used so as to ruin any plate; but in proper hands it is indispensable to the thrifty millman. The scrapers used in this district are made from $\frac{1}{2}$-inch steel, about 3 inches wide, ground square across, so as to give two right-angled edges.

We find that with certain ores of this district—notably those from the Bates-Hunter, Fisk and Corydon mines—the amalgam has a strong tendency to form hard scale on the plates, which cannot be removed with a rubber scraper, whisk broom or any such tool. But with a steel scraper the scale can be broken through and cracked off like a layer of dry putty, and this, if done properly, leaves the plate with a soft and "satiny" amalgam surface, if anything better for catching gold than the uneven surface of harder-scaled amalgam. The use of the steel scraper is almost always necessary with inside plates, where the scouring of the heavy mineralized pulp seems to harden all the amalgam.

Experience here shows that amalgam which forms hard scale on the plates yields bullion finer in gold and lower in silver than the softer variety, and it is generally obtained from ores carrying comparatively coarse or flaky gold. Possibly only the coarser precious metal tends to form hard amalgam scale on copper plates, so that while in the Drum Lummon ore, the native silver is the coarser, in the Gilpin county case, where native silver is almost unknown, scale can only form from ores carrying coarse gold.

One part of Mr. Bayliss' experience, as to the increasing proportion of silver to gold in the amalgam caught farthest from the battery, is duplicated here. After the apron plate, an amalgam trap and about 5 feet of blanket sluice, we secure part of the concentrates on percussion tables of the continuous (Gilpin county) type, the bed of the table being made of copper and amalgamated. On these a further trifling amount of amalgam is secured, and still more amalgam gradually accumulates on the tables, forming a rough scale, which is tough enough to trouble even a steel scraper, and can only be fully recovered when the table is worn out. Amalgam secured on this table yields bullion which almost always assays higher in silver and lower in gold than the average secured on the apron plate above.

(To be Continued.)

*Trans Am. Inst. M. E.

Pine Creek District, Colorado.

Written for the MINING AND SCIENTIFIC PRESS by H. L. MCCARN.

The new mining camp of Pine Creek, Gilpin county, Colo., is attracting considerable notice at the present time. A number of important strikes of recent date and the excellent showings made by the development work done during the past two years, have demonstrated that gold is there in paying quantities. The district is a large one, its boundaries being as yet undetermined. On the east it merges into the Silver Creek district; to the southwest it is connected with the Yankee Hill district by a chain of promising prospects. The dividing line between Gilpin and Boulder counties may be said, provisionally, to be its northern boundary; the Continental Divide its wall on the west. Superficial prospecting over the district in the past was, in the main, unsuccessful, and to a new lot of prospectors is due the credit of opening up its treasure vaults. Mining men have been inclined to look with doubting eyes on this region on account of its proximity to Central City and Black Hawk, feeling that if it had merit it would have been proved long ago by the hordes of prospectors which flocked to the "Golden Gilpin" in past years and prospected the country for many miles in all directions from Central City.

There are, however, several reasons for the failure of these early prospectors. The country was heavily timbered and the float largely covered by vegetation, which made prospecting difficult. During late years forest fires and the woodman's axe have removed this difficulty to a great extent. The silver excitements at Leadville and other parts of the State also had their effect in drawing the attention of prospectors to what were, at the time, more alluring fields.

But the chief cause of the region being so long in disfavor lies in the lack of knowledge of an important fact which has been demonstrated in late years, that the modes of occurrence of mineral may vary greatly in localities separated only by a short distance. The camps of Ward and Gold Hill in Boulder county, only six miles apart, illustrate this fact. The early prospectors who worked over the Pine Creek district were discouraged when they found that the surface features were different from what they were at Central City and Black Hawk, and as their educations were received at the mines of those camps and their only knowledge of prospecting was gained from observation of the conditions prevailing there, they condemned the Pine Creek district. The mines of Central City and those of Pine Creek do not differ greatly in the character of the ores in depth, but it is in the surface features that the great variation is shown. In the former camp the veins afforded considerable surface pockets of oxidized free-milling ores and the gold was easily saved by mercury, even with the crude machinery in use in early days. The great erosion and disintegration accompanying and succeeding the "Glacial Period" resulted in carrying the gold from the tops of the veins into the gulches, where it was easily gathered by sluicing, and also left the leads in a favorable condition for oxidation to a considerable depth. Pine Creek district, at an altitude of 1500 feet higher, does not appear to have been subjected to this glacial degradation, and, as a consequence, the leads were not scored off as at Central City. Most of the erosion seems to have been due to slow atmospheric action. The veins are oxidized to a very slight depth in many cases, unaltered sulphides being sometimes found at 15 or 20 feet and oxidized ore rarely extending to a depth of over 40 feet.

At from 20 to 40 feet most of the veins "cap," or become practically barren of value, and continue in this unhappy state to a depth of 80 or 100 feet, when the sulphide ores make their appearance. This barren portion, or "cap," as it is locally called, has greatly retarded development; but it has been demonstrated in the instances where the "cap" has been cut through and the sulphides reached that the quantity and quality of the ore has increased from three to ten fold over the surface ores. This class of vein is illustrated as No. 1 in sketch, (see front page), which shows the oxidized upper portion of vein, the "cap" and the unaltered sulphides in depth. No. 2 shows a vein in which the sulphides rush to the very top of "solid formation." The Ingram mine is an excellent example of No. 2, affording as it did unaltered "copper-iron" (chacopyrite) with high gold values at 16 feet from the surface.

No. 1 is, however, by far the more common form of vein in the district. The disintegrated tops of such veins are usually tipped over (as shown in sketch) and stratified in the wash below the vein. This phenomenon is locally called "flow" and is of great assistance in prospecting. When a prospector strikes "flow" in the wash he knows he is close to a vein, and has only to trench up the hill until the "flow" turns downwards and then sink for the quartz. This curved and often fan-shaped "flow" is colored yellow and brown by iron salts, but as a rule carries little or no gold, though the quartz in the vein may be rich. It is probably caused by successive slight land slips, which have in the course of time *tipped over* the disintegrated tops of these leads and stratified the vein matter in the wash below the veins. When the quartz is reached it often shows excellent gold values, but is usually "spotted." It seems as if during the oxidation and decomposition of the tops of these veins some solvent for gold must have been present, resulting in the leaching of a portion of the gold from the ore. This is notably the case with float from the copper leads. Most of such float is practically barren, while the "copper-iron" in the vein is generally rich in gold.

While the top quartz is, as a rule, not rich or uniform in value, there is generally a portion of it which will run well, and good producing quartz may be seen in many places throughout the camp.

One or two mines showed sufficient surface quartz of value to make it a considerable source of revenue, but such veins are the exception.

At from 20 to 40 feet leads of the character shown in sketch as No. 1 usually become barren ("capped"), and remain so until, as before stated, the sulphide ores are reached at 80 or 100 feet. The Platran, Gold Standard and Nancy Lee veins are of this character, and all of them produced sulphides at 90 or 100 feet, with values from three to six fold higher than their surface quartz contained, showing also a corresponding increase in the size of the streaks.

The Ingram and Side Issue mines belong to the class of veins shown in sketch as No. 2.

The former produced copper sulphides, with only a slight coating of oxide on the outside of the ore, at a depth of 16 feet from the surface. At 25 feet there was a streak on the hanging wall averaging 8 inches in thickness carrying values as follows at the sampling works: Gold (about), 3 ozs.; silver, 30 ozs.; copper, 13%—a value as smelting ore of about $90 per ton.

The Side Issue showed a good streak of galena and copper sulphide at 25 feet, carrying high values. Both these properties are in process of development and are making small shipments to the smelters, of the ore extracted in sinking. Several other prospects show partially oxidized sulphides near the surface, but by far the greater number of veins are of the kind illustrated in sketch No. 1 and will require sinking through "cap" to bring them into pay ore.

It will readily be understood why poor prospectors have hesitation in sinking on such veins for fear of getting into "cap," when they lack the means necessary to sink through the "cap" to the sulphides below. A number of excellent looking prospects at the surface were sunk to a depth of 50 feet or so and abandoned in "cap" by the unfortunate owners, who were too poor to sink them deeper. When the characteristics of these veins are more generally understood they will be developed and will doubtless, many of them, make good producers. Pine Creek is notable in the number of veins which show great strength and beauty at the surface, where decomposition and mineral solutions have intensified the streaks and vein structure.

Many of the leads are from 5 to 10 feet in width and cut the formation squarely and sharply. Slickensides and grooved walls are often seen. Owing to the "sheeted" structure of many of the veins "false walls" are common, which renders frequent crosscutting necessary, to avoid the possibility of missing the main ore streaks. The junction of veins at small angles appears to be favorable to the formation of "ore chutes" near the intersections. In addition to the fissures above mentioned, there occurs in some parts of the district another form of veins, which I have termed Foliation Veins. These veins follow the bedding or foliation planes of the schistose gneisses, and often appear to be replacements of the old feldspathic veins, with secondary quartz containing gold. As the gneisses often are but little inclined, the foliation veins have low dips, 30° from the horizontal being not uncommon.

The quartz in these veins is often rich in gold, but the streaks are small and variable, sometimes enlarging into lens-shaped masses of quartz eight or ten inches in thickness and then gradually thinning down to an inch or less. It is probable that these veins are "lateral enrichments" from great fissures which did not break through to the surface, but followed the lines of weakness, i. e., the bedding planes, when near enough the surface to be released from the great pressure of superincumbent rock-beds to which they were subjected at greater depths.

The country rock of the district is similar to that of the entire county—largely gneissic—all the gradations from structureless granite on the one hand to schistose-gneiss on the other occurring. The foliated gneisses in the northern and western portions of the district have rather uniform northerly dips of about 30° from the horizontal. A number of dykes and belts of eruptive rock cut the formation usually in a northerly and southerly direction. One dyke of porphyry, running about parallel with Pine creek, and but a short distance west of that stream, has been traced across the entire district. The rock of which this dyke is composed is of a bluish-gray color where fresh, but in most places is more or less altered and changed to yellow or brown shades by iron solutions. The porphyritically developed crystals are often elliptoid in shape, giving the rock the character commonly called "bird's-eye porphyry."

On the ridge and range of hills separating Pine creek from Silver creek there occurs a fine-grained eruptive granite (?) with porphyritic crystals of feldspar, some of them twinned. A similar rock is seen on Nevada Hill and in other parts of the camp. The crest of Nevada Hill appears to have been a shattered zone through which eruptive matter forced its way, cementing the shattered rock and forming it into a sort of giant breccia. A dyke of breccia with small inclusions cuts through a portion of this hill. The inclusions, averaging an inch or so in diameter, consist principally of a fair-grained hornblende schist of a dark green or black color and stand out plainly against the lighter colored and more acidic cementing magma, giving the rock a mottled appearance. This breccia is impregnated to some extent with copper pyrites, and near the surface is stained blue and green by copper carbonate. The inclusions are fragments of rocks of a different character from any found in place in the district, and are doubtless pieces broken from deep-seated rocks by explosive action. The minerals of the district are as follows so far as observed, viz.: Sulphide of iron of different forms, usually auriferous and often very rich in gold; copper pyrites (chalcopyrite), almost always rich in gold and carrying some silver; galena; iron sesquioxide (hematite), including the foliated variety (micaceous hematite); copper carbonate (rare); barite (heavy spar) in small quantities. Calcite was seen as a vein stone in one mine and molybdenite was also observed in the dump rock of another mine. Specimens showing visible gold are occasionally found, but are rare, although surface quartz assaying $1000 per ton or more has been uncovered in the camp. Tellurium has not been found as yet in the district.

Development work, though limited from lack of capital, has been very encouraging and warrants the belief that the field is destined to be a remunerative one to capital, when combined with good judgment in the selection and working of properties.

The sulphide ores show excellent values and are well adapted to concentration. Much of the ore is rich enough to be shipped direct to the smelters, and the copper and lead present add considerably to the value as smelting ore. Where silica is in such excess as to reduce the value below what is profitable as smelting ore, the simplest forms of concentrators or jigs will quickly and cheaply separate the quartz from the sulphides and leave a clean and valuable concentrate. An abundance of timber and water and a down-grade to the railroad and concentrators at Black Hawk, seven miles distant, are favorable accessories to profitable mining. In the judgment of the writer, who has studied the camp for over two years and watched development, it is well worthy of investigation by mining men. It is useless for anyone to expect to be able to form a just opinion of the district in a day or two's examination. A visitor will be shown good surface quartz and float which will pan well, and will at once wonder why such quartz is not milled. He will be apt to conclude that the veins are pockety and unreliable. In short, a superficial examination of the district will not, as a rule, result in a favorable opinion. It is necessary to study the result of actual development work and the nature of the phenomenon locally termed "cap" to form a just conclusion as to the merits of the camp. The strength and beauty of the fissures; the great improvement both in quantity and quality of the sulphide ores over the surface quartz and the facilities for economical mining are features which should recommend the district to practical mining men. Apex, the principal town of the district, has a population of about 500, and is well supplied with stores, hotels, etc. Stages connect with all trains at Black Hawk, seven miles distant. H. L. MCCARN.

Denver, Col., July 30th, '96.

Scientific Progress.

Utilizing Culm Heaps.

The Corral Hollow coal mines, near Livermore, Cal., now being in operation, it is proposed to establish a power plant there to utilize the coal screenings, generate electrical power and transmit it to San Francisco and suburbs.

The idea is to do the same with waste coal screenings as is now being done with tailings at so many of the mines, turn them into money or its equivalent. Pennsylvania has done it with its immense culm heaps.

In the early history of California gold mining material was thrown away which is producing fortunes for those who came after, and in the history of coal mining fuel has been discarded which in the future is to turn the wheels of industry; and that which actually constituted a drain upon resources made to contribute to the general wealth. The most significant indication of the progress of engineering science is the rapidly increasing directions in which hitherto waste products are being turned to account. A potent factor in scientific progress is the cheapening of methods of producing power; and, perhaps, second only to this in importance is the improvement in methods of transmitting this power from the point where it can be produced to the best advantage to the point where it can be utilized most advantageously. While it is true that there are some industries in which the cost of power forms so considerable a factor in the cost of the manufactured article as to be controlling, it is, nevertheless, true that if we consider the manufacturing industries as a whole the cost of power amounts to only about 10 per cent of that of the product; and in many cases, therefore, it is cheaper to bring the power to the raw material than the latter to the former. Niagara, with its enormous water power now partly utilized, has already attracted the attention of the whole world, and the promise of cheap power is held as an inducement to outside manufacturers to locate there or in the vicinity.

Coal mines, from the time of their opening, have been throwing away material which this generation is beginning to appreciate as of value, and as the old tailings from the mines have been worked over with profit, men are now working over the culm piles from the coal mines and appreciate their value.

As to the available quantity of this culm, perhaps the most reliable estimate is that given by the commission appointed by the Governor of Pennsylvania to investigate and report on the waste of coal. This commission, at the date of its report, May 20th, 1893, consisted of E. B. Coxe, H. S. Thompson and W. Griffith.

After estimating the proportions of the total coal mined that was wasted on the dumps in a number of the leading collieries, which varied from 19.7 to 74 per cent, they say: "Taking into consideration that the percentage of coal now sent to the dirt bank is much less than formerly, and the annual production greatly increased, it perhaps would not be unfair to estimate that, since the commencement of mining, the coal and coal dirt sent to the culm banks has been 35 per cent of the total production, say 315,700,000 tons."

W. Griffith, under date of April 20, 1892, contributed an article to the *Colliery Engineer and Metal Miner*, in which he estimated, on a basis of 20 per cent waste, that the amount of clean coal that went to the culm bank in the Scranton district alone, up to and including the year 1891, was 21,975,444 tons. The estimated total production of that district for the year 1891 was 6,193,390 tons. The output for 1895 amounted, in round numbers, to about 7,000,000 tons. If 20 per cent of this goes to the culm bank, there is a stream of energy annually flowing to that repository of 1,400,000 tons. Emery estimates 14.4 tons of coal per annual horse power, for 365 days of 20 hours each, for simple, high-speed, non-condensing engines.

If we assume that the fuel value of this coal, when recovered, is but 78 per cent of that of the best freshly mined egg, stove and chestnut, this 14.4 tons becomes 18 5 tons, and the 1,400,000 tons now annually going to the culm heap represent a stream of energy equivalent to 75,672 horse power. This is nearly equal to the maximum estimated capacity of the great Niagara tunnel. But, in addition to this as yet practically unutilized flow of energy, there is that vast amount already stored up in the culm banks during the years previous to 1892, estimated at nearly 22,000,000 tons, which, on the same basis, is equivalent to over 1,100,000 horse-power years—the storage of which, in one sense at least, has already been paid for. This annually increasing flow of energy, unlike the Falls of Niagara, has not, as it passed by, dissipated its energy, but in succeeding years has stored it up in an available form for utilization.

Some of the industrial establishments at Scranton obtain their culm from their own mines. One of the largest of these is the Lackawanna Iron and Steel Company. This company charges itself a nominal sum of 10 cents per ton for the culm it uses, and it is shoveled into the furnaces just as it comes from the breaker. When culm is spoken of in the culm bank, it refers to all of the material, both large and small; but when it is spoken of in the boiler house, it means simply the refuse, including dust and finer coal after the larger sizes have been separated. These larger sizes, including buckwheat and pea coal, command higher prices.

The refuse—strictly speaking, culm—is the fuel preferred by the manufacturers in Scranton, except where the haulage costs too much, when bird's-eye, buckwheat, or even pea coal are preferred; but all of the steam raised in this district is raised by the combustion of the products from the culm bank, and by far the most of it from the refuse or true culm. It is this that the Corral Hollow people propose to utilize and the experiment means much to the manufacturing interests of this city.

The Manufacture of Aluminum.

A new electrolytic process for the manufacture of aluminum has recently been patented in Europe.

The process consists in the decomposition by electric current of anhydrous alumina, rendered fusible by an appropriate flux. The inventor states that he obtains the direct decomposition of anhydrous alumina without the use of any salt of aluminum, such as fluorite or cryolite. The inventor, in order to dissolve the alumina, uses fluor-spar, to which he adds chloride of sodium in the following proportions: One part of chloride of sodium to three parts of fluor-spar.

This mixture, he states, melts very easily at a dark red heat, and can dissolve 25% of its weight of anhydrous alumina. By means of the electric current the mixture above noted is melted little by little until the recipient in which the operation is conducted contains enough melted bath, when the anhydrous alumina is added in small quantities till saturation. The alumina is decomposed into aluminum, which deposits at the bottom of the recipient, which serves as cathode and oxygen, and which combines with the anode of carbon to form oxide of carbon. At the end of twenty-four hours, more or less, according to the quantity of the alumina treated, the aluminum is taken away without interrupting the passage of the current, so that the process is a continuous one.

Instead of making the bath mixture of fluor-spar and common salt, one can use equally well alkaline silicate, or, better, boracic acid, or an alkaline borate, without any modification in the operation described above. The difference of potential between the electrodes in the case of the first bath is kept between three and four volts; in the case of each of the other baths, it should not fall below three volts nor go so high as to decompose the bath. Regarding the intensity of the current, it is, in each case, proportional to the amount of metal to be made, and is limited by the excessive temperature which will be produced by a current too intense. The apparatus used to contain the bath is a metallic pot, preferably of sheet steel, lined inside with carbon, and connected to the negation pole of the dynamo, thus forming the cathode again.

The positive pole is formed by a carbon anode which plunges into the fused bath, and is connected to the positive pole of the dynamo. This anode is fixed to a copper rod, which serves to support it, and at the same time acts as a conductor, and permits the anode to be raised or lowered, so as to keep the voltage between the required limits.

Electrical Progress.

The Future of the Roentgen Ray.

Professor A. Van der Naillen, president of the Van der Naillen School of Engineering in this city, delivered an interesting lecture on the Roentgen ray last week at Golden Gate Hall. The Professor has lately been in Europe, where he made a special study of the subject, consulting with the leading scientists of France and Belgium who are experimenting in that line, and brought back with him the newest apparatus and a number of plates, which were displayed with the aid of a stereopticon. Some of these photographs taken in Paris show the rapid progress that has been made since the recent discovery by Dr. Roentgen.

Upon the screen was shown a photograph of a diamond tiara, in which some of the diamonds had been substituted by paste by a swindling jeweler, the diamonds being transparent to the X ray, while their imitations were not, the diamonds being carbon and the imitations containing oxide of lead. The lecturer said that through the same means had been discovered adulteration of saffron by sulphate of barium and also of silk goods, into which certain minerals had been introduced to give body and volume to the stuff. Besides broken bones, the doctors had discovered that some mysterious swellings in the fingers of a girl were due to tuberculosis. Drs. Oudin and Barthelemi have settled the question whether the destruction of the bone in human bodies commenced at the center and worked toward the outside, or vice versa. The radiograph showed that the former was the case.

SKELETON OF FISH AS SEEN BY ROENTGEN RAY.

Dr. Olivier, he said, claims that the Roentgen rays have not said their last word. He predicts that, similar to the rays of light which show an octave of different colors, each having its separate ratio of vibration, and, consequently, endowed with some special properties, so will the Roentgen rays eventually prove capable of dissection and be found to contain diversified radiations endowed with different properties, some showing plainly bones, others muscle and cords, others nerves, others hearts or lungs, while others will bring to light the stomach, the brain, and show each one of these organs by itself, isolated from surroundings.

It appears that there are deleterious effects from the X ray apparatus upon the operators, according to the New York *Electrical Review*. It seems that H. D. Hawks, who had been giving exhibitions in the vicinity of New York with a powerful outfit, was at the end of four days compelled to cease active work, owing to the physical effects of the X rays upon his body. The first thing Mr. Hawks noticed was a drying of the skin, to which he paid no attention, but after awhile it became so painful that it was necessary to stop all operations. The hands began to swell and assumed the appearance of having a very deep sunburn. At the end of two weeks the skin all came off the hands. The knuckles were especially affected, they being the sorest part of the hand. Among other effects were the following: The growth of the finger nails was stopped and the hair on the skin that was exposed to the rays all dropped out, especially on the face and sides of the head. The hair at the temples has entirely disappeared, owing to the fact of Mr. Hawks having placed his head in close proximity to the tube to enable spectators to see the bones of the jaw. The eyes were quite bloodshot and the vision was considerably impaired. The eyelashes began to fall out and the lids to swell. The chest was also burned through the clothing, the burn resembling sunburn. To overcome these effects of the X rays, Mr. Hawks first tried covering his hand with vaseline and then putting a glove on, but the hand was at once burned again, the glove affording no protection whatever. The hand was finally protected by covering it with tin foil. Mr. Hawks coincides with Tesla's belief that X rays are practically minute material particles thrown off from the walls of the tube.

Steel, heated and then quenched in a bath through which an electric current is made to pass, is said to acquire extraordinary hardness, the invention being due to a Swiss engineer named Faux, inhabiting Strassburg, who demonstrated before a commission of engineers that a drill thus hardened passed through a piece of chilled cast iron twice as quickly as it would have done if hardened in the ordinary manner. A circular saw, similarly hardened, cut through iron bars with extraordinary felicity. With shears of this electric steel, an ordinary steel bar 35 mm. wide and 18 mm. thick (1⅜x22-32 inches) was cut through cold; and this operation was repeated five times with the same bar. A table knife cut through an iron wire of 1½ mm. diameter, eleven times running, with the same facility as it would have cut a piece of string if only hardened in the ordinary manner. Examination, by the magnifying glass, of the tools prepared by this method has revealed no change of structure.

Mechanical Progress.

Experiments in Firing a Boiler.

Those who believe that the formation of dense smoke in steam plants can be abated and the smoke nuisance in our cities and towns greatly reduced, and who at the same time believe that the formation of smoke cannot be wholly prevented without a loss in the efficiency of the boilers, will doubtless find support for their views in the results of a peculiar competitive test recently carried out under the auspices of the Sheffield Smoke Abatement Society. Five competing firemen were each allowed to fire a Lancaster boiler for seven consecutive hours, and the prize was awarded to the fireman who evaporated the greatest quantity of water with the least amount of fuel and with the least quantity of smoke. The boiler was 28 feet long and 8 feet in diameter, the two flues being 3 feet 3 inches in diameter at the front, tapering down to 2 feet 10 inches at the back. The grate measured 6 feet by 3 feet 3 inches, giving a total grate area of 39 square feet. The grate bars had ½-inch spaces. The working pressure was 100 pounds per square inch. The

coal used was "washed hard nut" and was of uniform size and very clean. The best result as to evaporation was equivalent to 9.03 pounds of water from and at 212° F. per pound of coal, but the fireman with this record had, on the other hand, the worst showing as to smoke. The first prize went to the fireman who secured an equivalent evaporation of 77.05 pounds of steam from and at 212° F., while only producing dense smoke for six minutes out of the whole seven hours occupied by the trial. This record was beaten by two other competitors, one of whom produced dense smoke for two minutes only and was responsible for an equivalent evaporation of 8.07 pounds per pound of coal, but he produced much more "faint" and medium smoke than the first prize winner, and so failed to head the list. The coal burnt per square foot of grate surface per hour ranged from 23 pounds to 28.1 pounds. Thus we see that the man who produced the least smoke was beaten by three or four of his competitors on evaporation. While this may go to show that an entire absence of smoke from the average boiler may mean a loss in efficiency, it must be in mind that all of the men produced amounts of smoke infinitesimal in comparison with the average fireman of to-day, and that the production of more than formed in the worst of the five trials would doubtless have been accompanied by a falling off in the evaporation. No argument can therefore be drawn against the improvement in the average of present practice so urgently needed.—American Engineer.

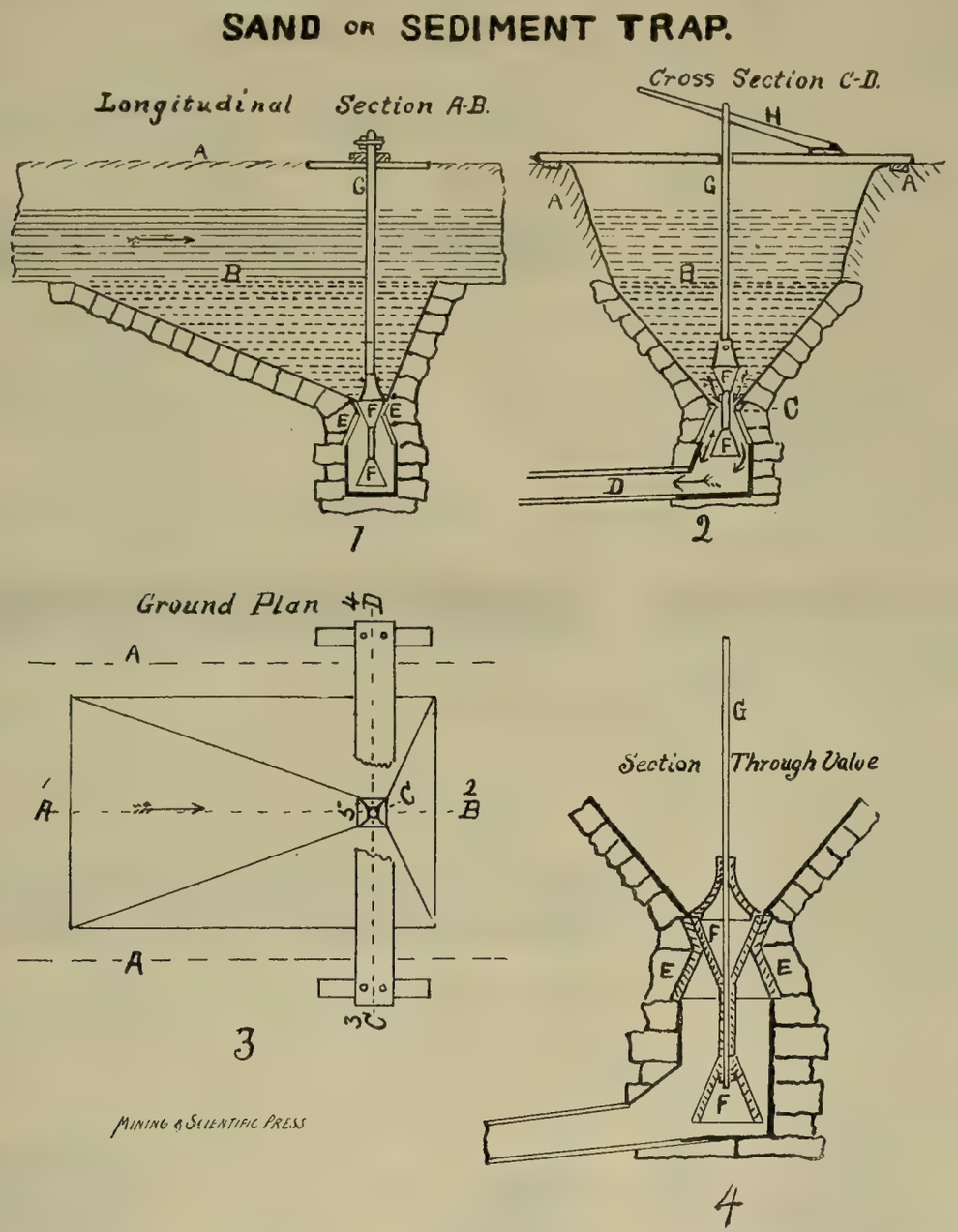
Sand or Sediment Trap.

The accompanying cuts illustrate the plan and details of a new sand and sediment trap, for use in irrigation and other canals, which, from surrounding conditions, are liable to a periodic filling up with sediment. The idea originated with George Ipson, of Salt Lake City, Utah, and was purchased by D. C. Robbins, of the same place, who was successful in his application for a United States patent for the invention. Later a company to handle the trap was incorporated in Salt Lake City; E. G. Rognon, president; D. C. Robbins, vice-president; E. H. Scott, secretary.

The device consists merely of a longitudinal depression in the bed of the canal or ditch, the incline on the upper or stream side being about 22 degrees from the horizontal, while the lower incline dips at about 80 degrees, so that it is impossible for sand or sediment that has flown into the trap to flow out again, until the trap is filled to the level of the bed of the canal. The sides of the trap slope down on an incline nearly corresponding to that of the lower end, so that the four sides of the excavation converge to the common point of the bottom of the pit, which is provided with a circular opening seated to receive a valve. In the original design this valve seat was made 10 inches in diameter, but in actual practice it has not exceeded 6 inches, the latter diameter in every case having proved to be sufficiently large for the drainage and flushing of the trap. Figure 4 shows the form of the valve. Since the idea first took form it has been decided to dispense with the lever, which, in Figure 2, is made the agent for opening and closing the valve, substituting a screw-thread on a rod, which will pass through the bridge across the top of the pit, and will be operated by a wheel similar to that used on the ordinary railway brake. With this improvement, it is expected that it will be possible in many cases to so adjust the valve that a small flow of water can be continuously flowing through and the sediment in the trap removed as it deposits itself. The disposition of the sediment thus discharged will depend entirely on local conditions and surroundings, but in most localities it can be conveyed into dry water ways. The trap can be made of any size, and, consequently, can be adapted to a canal or flume of any dimensions.

The utility of the device is apparent. In instances of heavy freshets it can be made the means of saving thousands of dollars by simply leaving the valves along the line of canal wide open, so that no opportunity occurs for filling up. Those who have witnessed the filling up of an expensive canal in times of flood, know that side outlets are not to be relied on as a means of discharge, and that the later cleaning out of the ditch frequently amounts to one-third the original cost of construction.

The trap is now being introduced in the canals of the Mount Nebo Irrigation Company in Utah county, and the corporation of Salt Lake City has decided to adopt it in the Parley's canyon conduit, which furnishes a considerable portion of that city's water supply.



Practical Information.

Pipe Covering Heat Loss.

The loss from a naked pipe is dependent upon the temperature of steam, and independent of the velocity of the steam in the pipe. Under ordinary conditions, the condensation loss from a naked pipe in still air is about one-third of a pound of steam, or about 320 heat units. This amount is increased by motion of the air. It seems most convenient to refer all steam coverings to the bore of the pipe as a standard, and this method is adopted in the following table. It will be noticed that with some coverings having fairly good conducting power the loss of heat increases with increase of thickness. This is due to the fact that an increase of thickness is accompanied by an increase in surface; if the heat passes readily through the covering, the amount it gives off will depend largely on the nature of the surface, and as this is increased the conducting power also increases.

The following gives results of tests of various pipe coverings made at Sibley College, Cornell University:

Kind of Covering.	*Relative Amount of Heat Transmitted.*
Naked pipe	100.
Two layers asbestos paper, 1-inch hair felt and canvas cover	15.2
Two layers asbestos paper, 1-inch hair felt, canvas cover, wrapped with manila paper	15.
Two layers asbestos paper, 1-inch hair felt	17.
Hair felt sectional covering, asbestos lined	18.6
One thickness asbestos board	59.4
Four thicknesses asbestos paper	50.3
Two layers asbestos paper	77.7
Wool felt, asbestos lined	23.1
Wool felt with air spaces, asbestos lined	19.7
Wool felt, plaster Paris lined	25.9
Asbestos molded with plaster Paris	31.8
Asbestos felted, pure long fiber	20.1
Asbestos and Sponge	18.8
Asbestos and wool felt	20.8
Magnesia, molded	22.4
Magnesia, sectional	18.8
Mineral wood, sectional	19.3
Rock wool, fibrous	20.3
Rock wool, felted	20.9
Fossil meal, molded, ¾-inch thick	29.7
Pipe painted with black asphaltum	113.5
Pipe painted with light drab lead paint	126.7
Pipe protected by wood tube, 3 feet earth	32.
Pipe protected by Wyckoff tube, 3 feet earth	18.

THE methods of the Rathburn Company an Deseronto, Province of Ontario, Canada, are worthy of emulation in many of the finest districts of this country. As described in the *Northeastern Lumberman*, they are making it a point to consume many forest products usually considered as waste material. Their annual drive comprises all sorts and conditions of logs. Of their cedar, for example, what is not suitable for lumber is made into railroad ties, fence posts or blocks for street paving and in some cases into shingles. Of the pine and spruce waste pieces that are not available for laths are cut into match splints and exported to England. Short pieces of lath not long enough for use are sent to New York to be made into banana crates. What is fit for nothing else is used or sold for fuel or used to make charcoal. The policy the company has pursued is more in the line of scientific forestry than most big firms in the lumber business in this country in the management and care of the forests they hold.

A CHICAGO company is constructing a monster belt, the dimensions being as follows: Length, 150 feet; width, 7 feet; weight, 3300 pounds; thickness, ⅞-inch. In its construction the selected portions of 450 oak-tanned hides, picked from over 5000 skins, were used. The belt is to be used in the engine room of the Louisiana Electric Light Company at New Orleans, where it will be attached to the 23-foot driving wheel of a great Allis-Corliss engine.

A FIRE PROOF SAFE made of cement with wire netting imbedded in it has been invented in Germany. One was lately tested by being placed upon a mass of wooden timber soaked in kerosene and a fire maintained for half an hour at a temperature of over 1800 degrees Fahrenheit. After cooling the contents were found entirely unharmed.

THE largest single wood pulp plant in the world is that of the Hudson River Pulp and Paper Co., at Corinth, N. Y., which consumes over 30,000,000 feet of spruce per annum.

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

TRINITY COUNTY—Continued.

NAME OF MINE.	Character of Mine.....	No. of Men Employed.	Location.	Name of Superintendent or Agent.	Address.
Paulsen & Hughes....	Gold.	2	3 m E of Douglass City..	P. M. Paulsen et al, Owner.	.....Weaverville
Phillips Hill.....	"	6	¼ m N of Lewiston.....	Phillips & Co., Own..	.....Lewiston
Price's Claim.....	"	7	Coxes Bar.....	T. B. Price, Own.....	.....Big Bar P. O.
Pony Point.....	"	3	1 m W of Taylors Flat...	John Cooper, Own.....	.....Big Bar P. O.
Quinby.....	"	4	9 m S of China Flat.....	Mrs. Jeanette Ziegler, Own.	..... Burnt Ranch
Rattlesnake.....	"	3	30 m NW of North Fork..	D. C. Dedrick, C. E. Smith et al, Own.	.....Junction City
Red Hills.....	"	13	3½ m W of Junction City	Day & Begel, Own.....	.....Junction City
Red Hill.....	"	3	Minersville.....	J. L. McClees, Own..	.....Minersville
Red Rock.....	Hyd'l'c	4	1½ m W of Lewiston....	V.M.Chamberlain,O'n	.....Lewiston
Rainbow.....	Gold.	10	12 m NW of Trinity Center	G. W. Bruner.....	....Trinity Center
Reindeer.....	"	2	9 m NW of Trinity Center	A. Hill.....	....Carrville P. O.
Ridgeway.....	"	.....	½ m N of New River City	Ridgeway G.M.Co,O'n	.....Denny P. O.
Rocky Point.....	"	.....	3 m NW of Cœur.....	Chas. Ellis, Own.....	.....Cœur
Soda Springs.....	Soda water.	.....	1½ m N of Dunsmuir.....	Unknown.....	.....
Sam Lee	Gold.	13	¾ m NE of Weaverville.	H. Junkaus.....	.....Weaverville
Swift & Co. Claim ...	"	3	3 m SE of Douglass City.	Swift & Co.....	....Douglass City
Snowden.....	"	5	W of Weaverville.....	Dr. Snowden, Own.....	.....Weaverville
Son & Co.....	"	10	4 m E of Weaverville...	The La Grange Co,O'n	.....Weaverville
Silver Gray Mine.....	"	6	2½ m SE of Dedrick	J. M. Tomkins, Own..	.....Dedrick
Sheridan.....	"	4	2 m S of Junction City...	Sheridan Bros.....	....Junction City
Smith's Group.....	"	.....	23 m N of Weaverville...	J. Smith, Own.....	.....Weaverville
Sulphur Springs.....	"	5	½ m W of Lewiston.....	V.M.Chamberlain,O'n	.....Lewiston
Strode Mine.....	"	20	5½ m NE of Trinity Center	Strode Bros., Own.....	....Trinity Center
Selfshooter.....	"	6	10 m N of Frances.....	Barnes & Co., Own...	.....Frances
Sherwood.....	"	6	1 m N of Cœur	O. P. Sherwood, Own.	.....Cœur
Sherman Claim.....	"	2	17 m N of Coleridge.....	Robt Sherman, Own..	.....Coleridge
Smith's Claim.....	"	3	26 m N of North Fork....	Smith Bros., Own....	.....Junction City
Sandy Bar.....	"	2	6 m W of Taylors Flat...	Thos. Wyatt, Own....	.....Big Bar
Snyder's Bar.....	"	2	4½ m W of Taylors Flat..	Rhodes & Palmer, Own	.....Big Bar
Stetson Claim.....	"	2	8 m W of China Flat.....	Stetson & Co.....	.....Big Bar
South Fork M. Co. Claim.	"	3	6 m S of China Flat.....	Peter Hammer, Supt.	.....China Flat
Sharpar.....	"	2	8½ m S of China Flat....	John Sharpar, Own....	.....Burnt Ranch
Scott.....	"	3	6 m S of Frances.....	Scott & Stout, Own...	.....Frances
Stevens.....	"	2	4 m N of Frances.....	F. P. Stevens, Own...	.....Cœur
Trinity River Hydraulic G. M. Co.....	Hyd'l'c	6	3½ m NW of Douglass City	A. G. Dunbar et al, O'n A. S. Dunbar, Supt.	....Douglass City
Toronto.....	Gold.	1	1½ m NW of Deadwood..	C. Murphy.....	.....Deadwood
Thompson.....	"	3	25 m NW of Trinity Center	.....	.....
Trinity G. Placer.....	"	16	23 m NW of Trinity Center	W Maitland, Own.....	....Trinity Center
Trinity River Co.....	Hyd'l'c	6	3½ m NW of Douglass City	A. S. Dunbar.....	....Douglass City
Tinsley.....	"	2	1 m E of Big Bar.....	G. W. Tinsley, Own..	.....Big Bar
Thomas Claim.....	"	3	6 m S of Frances.....	R. L. Thomas, Own..	.....Frances
Tough Nut.....	"	2	¼ m E of New River City	T. J. Ladd et al, Own	.....Denny
Taylor Flat.....	"	.....	Taylors Flat.....	Griffith, Perkins & Co., Own.	.....Big Bar
Union Hill.....	Gold.	....	1 m E of Douglass City...	Mason & Fair, Own...	....Douglass City
Underground Treasure Co.....	"	3	21 m NW of Trin'ty Center	P. Holland, Own.....	....Trinity Center
Uncle Sam.....	"	2	½ m NW of Cœur.....	Jas. Gullick, Own....	.....Cœur
Upper Smedes Bar. ..	"	2	1 m N of Taylors Flat ..	Chas. Kinteman, Own	.....Big Bar
Vermont.....	"	2	1½ m of Deadwood.....	Mrs. Falin, Own	.....Deadwood
Vance's Bar.....	"	2	Big Bar.....	Harrington & Wallace, Own.	.....Big Bar
Van Winkle.....	"	5	5 m W of Big Bar.....	Chas. Van Winkle, O'n	.....Big Bar
Weaver Basin (Chinese rockers).....	"	6	Weaver Basin	Chinese, Own.....	..... Weaverville
Wright & Nichols....	"	2	3½ m N of Minersville...	Wright & Nichols, Own	.....Minersville
Waters Claim.....	"	3	7 m N of Coleridge.....	Wm. Waters, Own.....	.....Coleridge
Wiltshire (Leased to Chinese)	"	6	At Big Bar.....	Stewart Gibson, Own	..... Weaverville
White's Bar (Leased to Chinese).....	"	10	1½ m N of Big Bar.....	J.W.Philloverake, O'n	.....Big Bar
Watson's Bar.....	"	3	1 m N of Taylor's Flat...	Pelletreau & Co., Own	.....Big Bar
Webber.....	"	2	8 m N of Frances.....	Webber & Niles, Own	.....Frances
Yellowstone.....	"	2	At Coleridge.....	R. Skinner, Own.....	.....Coleridge

TUOLUMNE COUNTY.

Atlas.....	Gold quartz.	1	1½ m NW of Tuttletown.	Jos. Podesta, Owner.	.....Tuttletown
Arbona.....	"	.....	¼ m SW of Tuttletown...	Phil Keefe, Own.....	..... Sonora
Anti-Chinese Mine...	"	.....	¼ m SW of Tuttletown...	Mrs. Ricketts, Own..	.....Rawhide
Alhambra.....	"	.....	1 m W of Tuttletown.....	.....	.....
App & Hislop.....	"	70	On Quartz Mountain.....	John Ballard, Supt...	Quartz Mountain
Argentum.....	"	.....	10 m NE of Columbia.....	J. B. Fownal, Own ...	.....Columbia
Alvarado.....	"	.....	12 m SE of Sonora.....	Fred Wengel, Own....	.....Sonora
Allen	"	.....	¾ m NW of Jamestown..	Howard Preston, Own	.....Jamestown
Ah Mow.....	"	12	1 m NW of Columbia.....	An Mow & Co., Own..	.....Columbia
Alabama Mine.....	"	.....	2 m NW of Quartz Mtn...	.....	.....
Alameda.....	"	6	1¼ m NW o Table Mtn..	Bondel, Clary & McDonald; M. B. Harriman, Supt.	..... Sonora
Alexander	"	.....	1¼ m S of Priests.....	.....	.....
Araminta.....	"	.....	17 m E of Sonora.....	Con. Gospel Virginia M'f'g Co.	..... Sonora
Argall.....	"	.....	6 m NE of G oveland.....	Henry Argall et al...	..... Groveland
Beckwith & Saunders	"	.....	2 m W of Tuttletown.....	Saunders & Beckwith	.....Tuttletown
Buchanan.....	"	.....	12 m SE of Sonora.....	Davis & Borum Est...	.....S. F.
Bonanza.....	"	3	Sonora	D. Oliver, Own & Supt	..... Sonora
Brant Point (Keystone).....	"	3	12 m NW of Quincy.....	G. Brant, Own.....	..... Quincy
Badger.....	"	.....	3½ m W of Tuttletown...	— Palmer, Own.....	..... Gilroy
Belle Mine.....	"	.....	1 m NW of Tuttletown...	Fred Sutton et al, O'n	..... Sonora
Belleview.....	"	16	6 m NE of Sonora	A. M. McDonald, Supt	..... Sonora
Black Oak.	"	38	¾ m N of Soulsbyville...	W. P. Scott, Supt.....	..... Sonora
Bonita	"	.....	1¾ m SE of Carters.....	A. Blanc, Supt.....	.....Carters
Buckeye.....	"	.....	1¾ m SW of Carters.....	Col. J. L. Coles, Supt.	.....Carters
Bald Mountain.....	"	4	½ m NE of Sonora.....	Birney & Hudson, O'n (Leased to H. S. Monroe).	..... Sonora
Benj. Harrison.....	"	.....	Jacksonville.....	Brown, Own.....	..... Sonora
Belcher Con.....	"	.....	1¼ m NW of Groveland..	Boston Co., Own	..... Boston
Big Oak Flat.....	"	.....	Big Oak Flat	H. A. Conrad, Own. (Bonded to Dr. Lee et al.)	..... Groveland
Binney.....	"	.....	7 m E of Columbia.....	.....	.....
Cardinelle	"	.....	¼ m N of Tuttletown....	Phil Keefe et al, Own	..... Sonora
Chimney Rock.....	"	.....	13 m N of Columbia.....	J. S. Sublette, Own...	.....Murphys
Columbus.....	"	.....	1 m N of Summerville...	Smith Bros., Own.....	.....Carters
Chapparal	"	1	12 m SE of Sonora.....	Fred Wenzell, Own...	..... Sonora
Cave Diggings.....	"	.....	2 m W of Buchanan Mine	Wm. Sharwood, Own.	.....Soulsbyville
Crystalline.....	"	.....	1¾ m NW of Quartz Mtn.	Rapp & Schaff, Own..	Crocker Bld, S. F.
Conlin & Graham.....	"	.....	2½ m SE of Columbia....	Conlin & Graham, O'n	.....Columbia
Conlin & Boswick....	"	8	2 m E of Columbia.....	Conlin & Boswick, O'n	.....Columbia
Coffee Mill.....	"	.....	McArdle Ranch.....	McArdle Bros., Own..	.Robinson's Ferry
Confidence	"	....	10 m NE of Sonora.....	Baker & Hamilton, O'n	.....S. F.
Cloudman.....	"	....	Stent.....	Edw. Fischer, Own.; E. A. Stent, Agt.	.....Stent
Canondale	"	.....	Columbia.....	Diego Lorenzo et al, Own.	.....Columbia
Carlotta.....	"	.....	½ m N of Carters.....	Fred Sutton, Own....	..... Sonora
Churchill.....	"	.....	Soulsbyville.....	Wm. Sharwood, Own.	.....Soulsbyville
Combination.....	"	.....	2½ m NW of Table Mtn..	R. Chute, Own.....	405 Front St., S. F.
Consuella.....	"	.....	1½ m SE of Carters.....	Bondel and T. G. Winwood, Supt.	..... Sonora
Corven.....	"	....	Sonora.....	Oliver Corven, Own..	..... Sonora
Clio.....	"	.....	½ m SE of Jacksonville..	Saml Ambrose, Agt..	.....Jacksonville
Cosmopolite	"	4	½ m SE of Big Oak Flat.	Poole Reid et al, Own	..... Groveland
Columbia Quarry.....	Marble	10	2½ m N of Columbia.....	W. D. Barmister, Supt	.....Columbia
Dutch Mine.....	"	15	Quartz Mountain.....	Alb. Trittenbach, Own	Quartz Mountain
Dundaro Mine.....	"	6	2¼ m E of Columbia.....	Louis Dundaro, Own.	.....Columbia
Darrow Mine.....	"	3	3½ m W of Sonora.....	Darrow & Co., Own...	..... Sonora

—* Begun in issue of April 25, '96. (To Be Continued.)

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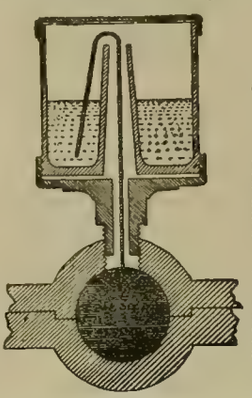
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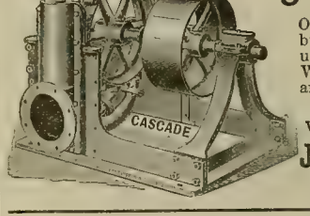

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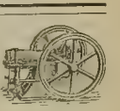

Mining Summary.

CALIFORNIA.

Amador.

Republican: Supt. Tregloan of the Spring Hill, Medium and Talisman is pressing work ahead. He is prospecting the Talisman from top to bottom, and is getting ready to put in new and larger machinery at the Medium.

The excavation for the new hoist at the Oneida mine is going along rapidly and will shortly be completed. The uprights for the hoist are to be 80 feet high.

Ledger: The shaft at the Treasure is down 400 feet and they are now crosscutting and drifting to prospect the ledge.

The old Wallace mine, now under the management of the White Bros., will be operating again in a few days, equipped throughout with new machinery.

Republican: Argonaut.—Reports are current to the effect that a body of rich ore, of unknown dimensions, has been encountered in this mine. Upon inquiry of those connected with the mine we learn that in cutting the station at the 1250-foot level a vein of quartz has been cut on the hanging wall on each side of the shaft. The size of the ledge is not known at present. While it is not what can be designated as rich ore, it is thought to carry gold in sufficient quantity to pay for working. The strike is not regarded as specially important. It is believed to be one of the ledges met with in the Kennedy, but not the one carrying the richest ore. This is claimed to be some distance in the foothills. A station has been cut at the 1350 level, but no ore body was encountered in doing this work.

Oneida.—Timbers are now being hauled for permanent hoisting works, the shaft is now down 380, and is progressing at the rate of 50 feet a month.

Zeila.—At this mine the rock is low grade, but is paying regular dividends, and whenever a new shaft is sunk six new stamps will be added.

Jackson Gate.—Drifting in the 350-foot level is in progress. The northwest drift is now in 160 feet, and in gold milling rock.

Union Consolidated.—The shaft is now down 390 feet. Shafts are being run in the Gouge ledge east and west. The mill is now being overhauled and will be running within the next thirty days.

Kennedy.—Sinking from the 2050 to the 2150 level in the north shaft is in progress.

Good Hope.—The 10-stamp mill, which has been moved from the Mechanics, is about to erected.

Alma.—The shaft is down 796 feet. Sinking will be continued until a depth of 1,000 feet is reached, when a station will be cut and the mine opened up.

Anita.—The shaft is now down 500 feet. As soon as a sump is sunk a station will be cut and the mine opened up.

Butte.

The Golden Butterfly has passed into new hands. Owing to some disagreement the English syndicate did not purchase the mine, as was anticipated, and it has now passed into the control of a San Francisco company, which will proceed to work it.

James Pullen, who has been developing the Mt. Ida quartz mine, near Hurleton, has gone to San Francisco for the purpose of purchasing a new 5-stamp quartz mill, which will be erected during the present month.

The Banner quartz mill has begun dropping stamps and it is said the run will be a long-continued one.

Mercury: The old '49 mine, now known as the Oregon, situated on the hill above the Enterprise, is showing up well from the development work. Josiah Champion of San Francisco, who purchased it lately, is in charge. One tunnel was run into the mountain about 150 feet, when it tapped the ledge. Here the prospect was such that a lower tunnel was started, which is now in about 400 feet. It is at the foot of this tunnel that the mill will be erected. Eleven hundred feet of steel rails for a railroad track, together with cars, were recently forwarded to the mine.

J. D. Campbell has taken hold of the Old Milard mine and is now running a tunnel to tap a shaft formerly sunk upon the claim, and which proved to be very rich. The claim, however, is located on the bank of the west branch of the Feather river, and water flowed in faster than it could be handled without the aid of powerful machinery, and the work of mining had to cease.

It was in this claim that Ira Wetherbee picked up the 54-pound chunk in 1859. Mr. Campbell now has but a few feet to extend his tunnel to reach the shaft, which will thoroughly drain the claim and enable it to be successfully worked.

Mercury: At the Gold Bank & Stow mine at Forbestown the 40-stamp mill is crushing 143 tons of rock every 24 hours. The improvements on this property consist of hoisting works, a 40-stamp mill with sixteen concentrators, two canvas plants, chlorination works, and air compressor, all run by water power, of which they have an abundance. The development consists of six tunnels and one shaft down 360 feet on the incline of the vein. They are at present working about 100 men in the mine and mill. They are now engaged in running a crosscut, which, when completed, will tap the ledge at 500 feet vertical below the present workings. It is in now about 1800 feet and they are expecting to soon strike the ore body, in which event they will move their mill and other buildings necessary, below the mouth of this tunnel.

Calaveras.

Angel's *Voice*: At Murphy's the De Lays have incorporated their recent purchases of McQaig brothers for $50,000.

It is reported that the much bonded Gumboot mine has again been bonded by Prince Poniatowski.

At the Gwin mine the vein on the 1300-foot level has been crosscut and shows a good grade of milling ore which prospects well in free gold. The grading for the mill is about completed, and the foundation work will be commenced immediately.

Chronicle: Encouraging prospects are reported from the Bund mine, now being operated by the California Exploration Company.

All the machinery for the South Paloma mine is now in place. Operations will be begun next week. The hoist on the mine will be run by steam power, the engine being capable of sinking 1000 feet.

The shaft in the Fellowcraft mine is down 220 feet, and it is expected that the mill will be running in about three weeks.

Men are at work on the Central Hill gravel mine running drifts in the bank for blasting and breaking up the ground preparatory for accelerating work when the season opens. The run of the season just closed was a remunerative one.

At the South Paloma the new 40-horse power steam hoist has been completed and the management is preparing to sink an additional 600 feet in the vein and then drift and crosscut. They are now down a depth of 175 feet.

El Dorado.

(Special Correspondence).—The Lone Jack mine, for two years past in litigation, now happily settled, is about to resume operations. The property is near the Taylor mine, in the Garden Valley or old Johnstown district, about ten miles north of Placerville.

The Baltic Mining and Milling Co. is preparing to erect a 10-stamp mill. Goodwin George is president and Mr. Thurwachter, treasurer, of the company. Postoffice, Sly Park.

John Melton has filed location notice of water right on the south fork of the American river, about three miles from Placerville, for mining, milling and general electric purposes. The papers of record are for 5000 inches under four-inch pressure.

It is currently reported that Stent and Coffin have bought under bond the old Griffith Consolidated and four adjoining claims. These properties are just below and contiguous to the Larkin mine. The Griffith Consolidated, embodying two claims, has a reputable record. If work is faithfully crowded upon this in further development, as has been the case with its neighbor, the Larkin, that section will prove one among California's greatest mining quarters and of El Dorado county's bonanzas.

El Dorado county is gradually becoming known (in spite of her more recent record as a fruit grower) for her large quartz deposits. It is difficult to convince Eastern people that gold mines exist in the midst of gardens and orchards, but personal inspection convinces them of the truth of such facts.

In addition to the two 10-stamp mills recently started, the Boulder and the Star Light, and the Baltic, the Victor, and Lucky Marion at Greenwood, are preparing for the early construction of a mill. Another is the Larkin. Superintendent Jackson is at present in San Francisco negotiating for a complete outfit comprising a 10-stamp mill, to be constructed without delay.

Placerville, Cal., Aug. 26, '96.

Democrat: At the Victor mine, 14 miles east of Placerville on the Mosquito divide, a new body of ore has been unearthed. It is proposed to erect a mill as soon as possible.

An important strike has been made in the Ida Mitchell mine, situated right in the heart of this city. While drifting south, and only 15 feet from the point where work was abandoned some twenty-five years ago, a 5-foot ledge of ribbon-rock was tapped.

The Starlight Completed their 10-stamp mill, seven miles west of Placerville.

Inyo.

Register: The Mammoth mill and mining property is closed by legal proceedings, developed by dissensions among the Chicago owners. As we understand it, the merits of the mine have nothing to do with the shut down, therefore it is presumed that work will be begun again as soon as affairs are straightened out.

At Silver Peak the mill is running day and night, and Chiatovich is preparing to start up his mill in a few days. Two teams are hauling ore for his mine near Gold mountain. He has 400 tons ready to crush. Work is being pushed on the Silver Peak mines by L. J. Hanchett.

Kern.

Californian: In the Panamint district five claims, owned by Cole, Montgomery and others, have been bonded to San Francisco people for $35,000.

Another strike has been made on the Butte mine, at Randsburg, showing free gold in the croppings and sulphurets.

The erection of another mill has been commenced at Goler by J. M. McKearnan of Porterville. It will be only two stamps and will begin crushing Burcham ore.

Mariposa.

Miner: B. S. Hill is purchasing a hoisting plant for the Kohler group of mines.

The Merced Company still continue work in their mines here. Sinking in the Melvina shaft is going steadily on and drifting on the ledge in the Louise still continues. Development work on the Mahoney and Mary Harrison is being pushed.

Nevada.

Union: Twenty stamps of the Providence mill were again started up last Saturday. The remaining twenty are being overhauled and will be dropping in a month.

Transcript: The rumor that the W. Y. O. D. mine was about to suspend operations is pronounced false. The company have recently struck a barren spot in their mine, but they expect to readily regain the pay chute.

Placer.

Capt. Montgomery, owner of the La Trinidad mine, in Sailor canyon, twelve miles southeast of Cisco, will place a mill on the property this season. Fifteen men are now employed at the mine.

Herald: The successors of the Baccarat Mining Co. at Lincoln have sunk a shaft about 25 feet and have found good gravel. It is about two hundred yards east and north of the old shaft.

The Mayflower mill is again running steadily.

Plumas.

National-Bulletin: C. C. Rachford & Co. have their tunnel in about 300 feet and are preparing to wash gravel on their mine on Yellow creek.

Manager Edwards of the Silver King mine in Arizona, accompanied by a photographer, last week went down to Rich Gulch to examine the Hallsted, Duncan and Patten quartz properties, in the interest of an English syndicate represented by C. W. Ertz, who has an option on the properties.

San Bernardino.

(Special Correspondence).—The awakened inserest in mining matters in this section has partially solved the problem of work for the unemployed, for the latter are scattered out among the hills and on the deserts, wherever there is a chance for the discovery of gold or silver. The result has been the locating of more claims during the past few months than for the previous ten years. Scarcely a day passes but there is news of valuable finds. A prospector came in last week from Randsburg, in the northern part of this county, having located at St. Elmo, six miles south of Randsburg. A sample he brought in would probably go up into the thousands. There was an immediate rush of prospectors, and everything in sight was staked out within a few hours. The Board of Supervisors will immediately have a road opened up direct to this future great mining center. The Rose mine was sold recently to a foreign syndicate, and their first work uncovered a body of good ore. This mine is located within a few miles of this city, in the mountain range.

San Bernardino, Cal., August 25, 1896.

Shasta.

Courier: The Three Sisters group of mines in French gulch district, owned by the Ellerys, have been bonded to San Francisco parties for $40,000.

J. P. Kingsbury and W. D. Bull are shipping ore from the old Crystal mine.

The new mill and crusher at Lower springs have been started up.

Free Press: A strike has been made in Supervisor Conant's mine at Harrison gulch of an 18-inch vein carrying considerable free gold.

J. W. Parmelee has filed an attachment suit in the Superior Court for the sum of $10,949.63 against the Parmelee Ore Concentrating Company, a corporation of Chicago, who own the famous Minnesota mine on Spring creek.

Journal: A large number of mining locations have been made the past few weeks, along the Klamath river. The taking up of these claims is evidently inspired by the successful operation of the new dredger on the Klamath river. If the gravel in the bed of the Klamath will go even 20 cents to the ton, it is a paying business, as the big scoop handles a ton of ore each trip.

The Nebraska mill on Cherry creek is in operation.

Henry and George Spannaus who have leased the Magee mine on Klamath river, struck some very rich gravel last week.

Wm. Bennet of Forks of Salmon has been making preparations to work his mines on Salmon river on a more extensive scale this year than usual. He has just finished cutting 120,000 feet of lumber for use in the mines.

Searchlight: During the past week 80 or 90 men were put on at the mines and smelter of the Mountain Mines Company. At the mines the wages are $1 per day and at the smelter $2 and board. Roasters are preparing ore for treatment and the smelter will start up soon.

Supervisor W. R. Conant has disposed of his Harrison gulch properties for $20,000 to Captain Roberts.

Sierra.

Enterprise: The Sierra Gold Co. on the East Fork will soon have all the machinery of the Mt. Moriah mill on the ground. The foundation is now well advanced, so that the new mill will be running on ore within a few months.

Siskiyou.

Journal: The miners on Klamath river are in the midst of their busiest season. It is said that the prospects for most of the river mines is better than usual this year, as they got a good start and their work has not been interfered with since.

At the old Lawson mine, on the South Fork of Humbug, some fine-looking quartz is being taken out. It is contemplated to put up an arrastra on the property soon.

Tuolumne.

Union-Democrat: The Slap Jack mine at Greenland has changed hands and high-grade ore is being developed.

The new electric power plant at the Santa Ysabel and the new hoist at the Dutch are now in operation. The air compressor at the App will be ready in a week.

Material for development of the Whisky Hill group is being hauled on the ground. This is the property recently purchased by the Newcomb-Buckmeister syndicate for $130,000.

It is reported that the Rawhide and App mills will be increased twenty stamps each.

J. L. Coles expects to resume work on the Seminole group next month.

The furnaces for the new chlorination plant at the Rawhide will be begun next week.

E. W. Hebard of the Soulsby mine has bonded the Continental claim, on the south fork of the Stanislaus river.

Independent: The Little Wonder quartz mine at Groveland has been bonded by F. Marconi of Big Oak Flat to Col. Haskell, who is about to commence the erection of a mill.

NEVADA.

HUMBOLDT COUNTY.

Silver State: Tuscarora is looking up. The Dexter company's new quartz mill is crushing ore and development work going on in other mines.

LANDER COUNTY.

At Austin, the Austin Mining Company's tunnel is now 5,000 feet in. There are 1,000 feet more to be pierced; 100 men are at work and it is expected the tunnel will be completed January 1, 1897.

OREGON.

BAKER COUNTY.

Democrat: The sale of the Columbia mine for $100,000, the pending sales of the Baisley-Elkhorn for $100,000, the Simmons group for $40,000, the Bonanza for upwards of $300,000, and other properties in the Flagstaff, Virtue and White Swan districts, at prices ranging from $5000 to $20,000; of properties in the Sumpter and Granite districts, at from $5000 to $50,000, all show that there is a whirl in mining in Baker county.

Jacksonville *Times*: The Applegate Mining and Milling Co. are pushing development work on their group of quartz mines with good prospects.

It is reported that $600 worth of gold was taken out of the Bonanza mine, in Williams Creek district, one day last week.

John and George Anderson have struck a rich ledge on Horsehead creek, Josephine county, from which they are taking considerable gold.

The Seven Devils Mining and Real Estate Company has incorporated; capital, $120,000; office, Baker City.

From the preparations going on in Galice Creek district, there will be more hydraulic mining there during the coming season than at any time in the history of that section. A number of new plants will be put in and some of the old ones enlarged.

In the Flagstaff district, Baker county, the Bradbury Bros. have found a new ledge four feet wide. Scott, Phillips and Kirk have a six-foot extension of the Flagstaff. H. S. Bowen and J. M. Lachner have bonded the Sound Money group to Chicago parties. The Red Jacket is showing ore assaying from $10 to $30 gold.

Simkins & Fowler have completed their wing dam in Rogue river, near Crow's ranch, and are ready for mining operations.

Active operations have been resumed at the Shorty mine in Ashland district.

WASHINGTON.

The Silver Queen Mining and Milling Company has been organized; capital stock, $500,000. This company succeeds what was formerly the Silver Queen Mining Company and becomes the owner of the Silver Queen and Last Chance mining claims on Rickey Hill.

BRITISH COLUMBIA.

Rossland *Miner*: There is a prospect that the West Le Roi and Josie property will soon be rid of all its entanglements and sold to a strong company. There were large transfers of the company's shares last week and it transpires that the Jones-Warren wing have secured control, they now holding over 400,000 out of the 500,000 shares.

In the Galena Farm group which was lately bonded to a London syndicate, for $50,000, it is reported that a rich strike has been made and that there is more ore in sight to pay for the mine.

Work is being pushed on the Slocan Star, Ruth and Wonderful groups of mines, all of which are tributary and close to Sandon. Since the concentrator on the Slocan Star began operations it has worked almost exclusively on the old dumps. So far over 2500 tons of concentrates have been produced and much ore still remains to be treated. It is now evident that the dumps contained nearly 20,000 tons of ore. Most of the ore already treated has produced one ton of concentrates averaging 90 ounces in silver and nearly 70 per cent in lead for each four tons put through the mill. Byron N. White the general manager of the company states that they will realize at least $300,000 from the old dumps.

Spokesman-Review: At Rossland the Novelty, on the south slope of Red mountain, adjoining the California, has been sold to an outside syndicate for $20,000.

Rapid work is being done on the Red Mountain Railway and the graders will be in full sight of Rossland by the end of next week. The road bed will be completed by the first of September, and tracklaying will start at once. The completion of the road will give Rossland an all-rail connection with Spokane.

The official figures of the output of the Kootenay mines for the year ending July 1st are defective, in that they only include the ore exported in the customs district of Nelson and estimates of that which went out through the port of Revelstoke. The output for the year is shown to be 30,673 ounces of gold, valued at $552,135; 1,459,629 ounces silver, $969,215; 11,647 tons copper, $129,250; 6020 tons lead, $220,849, a total valuation of $1,871,449; 6410 tons by way of Revelstoke are estimated to be worth $100 a ton, which adds $641,000 to the foregoing amount, or a total of $2,512,449.

In the Poorman tunnel there are 8 feet of iron and copper ore and no foot wall in sight.

In addition to furnishing the Trail smelter with all the ore the road is able to handle, the Le Roi Company is daily shipping 30 to 40 tons by wagon to Northport, and thence to the coast smelters.

Nelson *Tribune*: The Canadian Pacific Mining and Milling Company's concentrator will be in operation October 15th, and will have a capacity of 50 tons a day. The company's holding consists of four claims on Woodbury creek, near Ainsworth, and will be developed by power drills.

The owners of the Homestake, at Rossland, will endeavor to float a company on the London market with a capital of $1,000,000.

The returns of shipments of bullion, matte

and ore from the mines and smelters in southern Kootenay in one week this month were 901¼ tons, valued at $66,525. Total for 1896 so far, 18,285½ tons, valued at $2,000,850.

A strike is reported on the north fork of the Salmon. The leads are said to be from 15 to 20 feet wide, containing peacock and black oxide of copper.

At Florence P. Fitzgerald has sold his group of claims, the principal one of which is the Bull Pen, to Cunningham & Chapman of the Coeur d'Alenes for $20,000. This includes several placer claims.

ALASKA.

At the Mexican, with the additions lately made, 120 stamps are now falling.

The new ten-stamp mill of the Jualin Mining Company at Berners has started up.

The steamer "Al-ki" at Seattle from Alaska brings seventy-five miners from Cooks Inlet. They had only tales of hardship to tell and came back empty-handed, cursing the country. One man had $5 in gold dust, which he said cost him $500.

The Alaska *News* publishes an interview with William Bowers, an experienced miner, who recently returned from Cook's Inlet. Bowers said: "It is a mistake for those who have failed to find anything this summer to say the country is not good, and that there is nothing in it, for that is untrue. There are good diggings on the tributaries of Turn-Again Arm; ground that pays well, much more than wages; but the trouble is there is not much of it. The gold seems to be scattered over the country in patches. Good ground will be found on this creek and barren ground a few miles distant. The country has been pretty thoroughly prospected this season, as I met men from nearly every spot in the entire region. There is gold there, and quite a considerable quantity, but in my opinion in not nearly sufficient amounts to justify nor support the crowd that flocked there this spring."

The Alaska-Treadwell Company's yearly report shows a production of 263,670 tons, at a cost of 34¼ cents per ton. During the year the mine paid $450,000 in dividends; the net profits were $497,342.

UTAH.

Salt Lake *Tribune*: The deal for the sale of the Sage Hen group of three claims in the Mercur district, adjoining the Sacramento on the south, has been consummated, the owners transferring the property to George H. Gillett, a Minnesota man, in consideration of $55,000.

The incline at the Sunshine is to be continued to a depth of 1000 feet, and the ground as systematically explored from that station as it has been from the upper ones. The same theory is applied to Sunshine by competent mining men as is that which covers Mercur concerning the value of the ores at great depth.

At Tintic a promising strike of an ore body was made in the Humbug last week. The ore is lead and silver, and from six assays made the lowest was fifty-one ounces silver, while the highest ran over 700 ounces, and an average of the ore body, which is about six feet wide, is 143 ounces silver, $15 gold and 36 per cent lead.

L. E. Riter and C. V. Wheeler have bonded the Rover claim at Tintic to P. J. Donohoe, G. H. Robinson and others; the consideration is understood to be $45,000.

Bingham *Bulletin*: The Old Telegraph leasers had on the 19th shipped 1020 tons of ore since August 1.

Tribune: Notice has been served on Col. Heffron, manager of the Niagara Mining Company's property, and several others that no more ore would be received at the Mingo smelter from that source. The explanation accompanying the notice was that the lead market was glutted, that the warehouses were filled to their utmost and that until conditions were settled the smelter could not afford to invest in lead ore. Manager Heffron announces that the Niagara will shut down.

Col. Dorsey, manager of the Overland mine, Utah, proposes to build a mill of 150 tons daily capacity. The ore averages $8 per ton and there is plenty of it.

In the Herschell, at Mercur, the tunnel has advanced 600 feet, but it is not expected to encounter the ore body until 1000 feet have been run.

IDAHO.

The Bunker Hill has laid off 50 men and the Gem mine has been closed down and the pumps pulled out, throwing 70 men out of employment.

The Tip Top group of mines in Owyhee county have been sold by State Treasurer Bunting to W. S. McCormick, the Salt Lake banker.

Theodore Burback of Salt Lake and his associates have purchased for $100,000 placer gravel bars lying for three miles along Anderson creek, in Lemhi county, Idaho. All of the gold is exceedingly coarse, while not infrequently nuggets are found of the value of over $5. It is claimed that the bars throughout will average 65 cents per cubic yard.

MONTANA.

Inter-Mountain: It is reported that an English syndicate is figuring on the purchase of a number of claims on the porphyry dyke near Rimini, and if the deal goes through that a mill of 1000 stamps will be erected next spring to crush the ore. The dyke is an immense one and contains large bodies of ore, but generally of such a "streaky" nature that with few exceptions it has been found impracticable to work it at a profit.

The Black Sheep property in Beef Straight gulch, which was extensively worked by Butte parties three years ago, and which was condemned by experts, has passed into the control of W. A. Clarke, who will begin shipments at once to Butte.

W. A. Clark is negotiating for the purchase of the Mayflower No. 3 gold mine, near Whitehall. It is understood that Mr Clark has an option on the Mayflower for $150,000. The property is owned by S. R. Fair and Edwin M. Clark of Butte and C. J. Pruett of Whitehall. About $60,000 has already been taken from the mine during the two months it has been worked.

The Gold Hill Mining Company, limited, with twelve consolidated claims on Gold creek, is now organized and on a working basis. This camp is six miles distant from Jerome creek camp. Everything tends to show that the locations of the company are the sources of the big placer deposits of Gold creek, which have been continuously worked since discovery in 1864.

The Apex Consolidated M. Co. have recently struck a large body of ore in their new workings that has an average value of $10 per ton and is free milling in character, in addition to a large percentage of concentrates worth from $35 to $100 gold per ton. Thirty of the stamps out of the sixty in the company's mill are dropping night and day, crushing on an average 100 tons of ore every twenty-four hours.

Mining World: The Boston Stock Exchange has admitted the Anaconda Copper Mining Company of Butte to its exchange. It announces that the company has 1,200,000 shares of a par value of $25 each, and that it has paid but one dividend--that of May 1st, of $750,000.

The Alice Company is now dropping sixty stamps on ore from the mines of the company.

It is understood that as soon as the present supply of fuel on hand is consumed, the Montana Ore Purchasing Company will suspend operations on the Camp Creek properties.

The Golden Scepter Mining Company paid out over $80,000 the last payday, $60,000 of which amount was for labor. Five hundred men are on the payroll.

The Monarch group, consisting of the Monarch, Concentrated and British Lion claim at Neihart, has been sold to A. M. Henry and R. G. Wight in trust for the Florence Mining Company. The consideration is said to be $60,000.

WYOMING.

There is at the present time great activity along the many tributaries of the Big Laramie, and many prospectors are on the ground. A party of surveyors is engaged in selecting a route for a railroad to run from Fort Collins on a water grade into North Park. Several good placer properties situated on Independence mountain have recently been purchased by Colorado capitalists and contracts are being made to build the necessary ditches.

Hinman & Sheldon of Atlantic City have purchased the Downey stamp mill in the Gold Hill district, near Saratoga, and will remodel and refit it for the treatment of ores by the cyanide process. Four mines in the district are taking out ore and the new mill will have abundant product to work upon.

The Inter Ocean Mining Company has completed 1400 feet of fluming at its placer property on North Spring creek and is sluicing with considerable success. The gold taken out is very coarse.

SOUTH DAKOTA.

For the Homestake Co. the secretary's report shows that during the year the 100-stamp mill was in operation twelve months, the 160-stamp and the 200-stamp three months each. The three mills, aggregating 460 stamps, crushed 245,220 tons of ore, net returns $1,158,-457.66. The concentrates recovered from the tailings yielded $12,732.41, making the net product for the year $1,171,190.07; disbursements, dividends, $375,000; labor, $334,569.07; dead work sundries, $57,413.25; water, $48,-085.63; coal, $91,065.75.

Black Hills *Times*: Reports from Galena are that there are 150 men employed in the various mines and prospects. The Union Hill Mining Company will soon have the stamps in the smelter in shape to make a test run on the free-milling gold ores opened up during the past month on their Union Hill properties.

Wasp No. 2 Mining Company, under the present ownership, has produced $120,000, and has at the present time more ore in sight than at any time since first discovered.

COLORADO.

Cripple Creek *Mail*: A batch of talc from Oil creek was washed Monday at Gillett that went $50 to the ton. Heretofore the talc has been thrown away.

It has so far been found impossible to start the Peck mill at the Independence, and it may be necessary to make changes in the machinery, which will postpone its successful operation.

The Gold Geyser stamp mill and the Raven, Gold Geysers Nos. 1 and 2 lode claims, south of Cripple Creek, have been sold to Chicago parties for $35,000. A cyanide process will be added to the stamps.

The Ross & Hurd tunnel, in the southern spur at Raven Hill, has begun work with its new steam and air plant. The tunnel will be pushed in about 3000 feet, where it will connect with the Watson tunnel, and insure good air for both. The Watson is going diagonally into Raven toward Bull Hill. The plan of the operators is to continue 12,000 feet and come out of Bull Hill near the Victor mine.

Republican: Two tons of the talc taken from the new vein recently opened in the Lucky Guss, at Cripple Creek, ran $1840 a ton. The talc seam is from two to eight inches in width, and so far has been continuous in the working. Alongside lies two feet of a milling ore, the screenings of which run about $40.

At Saw Pit the Commercial group, composed of the Commercial, Jupiter, Lucky Jo, Florence L., Independence and Mayflower, has been disposed of by bond and lease to the San Juan Gold Mining Company of Milwaukee, Wis.

A rich strike of silver ore has been reported at Montrose.

The Silver Queen mine on Seaton mountain has been put in shape for mining. The lower levels are being drifted on, and it is reported by the management that a body of ore has already been cut, a test run of which returned $200 gold to the ton.

Drifting in the Lexington tunnel has been commenced and a contract calls for its extension of 200 feet to connect with the shaft, making it 800 feet in length.

A new concentrating mill is being erected at the mouth of Chicago creek by J. G. Roberts for the handling of all Clear creek ores. The capacity of the mill will be for 100 tons of crude ore a day, although, to commence with, but 50 tons will be treated.

At Gillett the Summit mill, which has lain idle for the past three months, has started to work on ore from the Summit mines from Bull Hill, beginning on 100 tons, and it is anticipated that there will be no further shut down of this mill this year. The mill employs 40 men, and has an annual pay-roll of $48,000.

The production of ore for July from the properties of the Golden Fleece Mining and Milling Company amounted to $35,773.44. The expenses for the month were $15,011.56, leaving a profit for the month of $20,761.88. The company has also purchased the Gov. Pitkin mining claim, which adjoins the Golden Fleece. The payments on this claim will have to be made on March 1 and Sept. 1, 1897. This could not be done and the 3 cent dividend continued without depleting their ore reserve, contrary to good mining and business prudence.

The general manager of the Argentum-Juniata Company gives the following figures in connection with the mine for the thirteen months ending July 1, '96:

Development work	5070 feet
No of sets (timbers) placed in the workings	661
Ground supported by the same	3192 feet
Diamond drill work	5661 feet
Ore shipments:	
Tons shipped	9,191.178
Average assay, silver ounces	83.71
Gross value	$493,349.05
Average value	$53.67
Freight charges	$63,750.37
Average per ton	$6.93
Smelting charges	$25,977.33
Average per ton	$2.83
Net cash returns for ore	$403,621.35
Average per ton	$43.91
Total contents of ore:	
Silver, ounces	764,443.43
Lead, pounds	166,188.00
Operating expenses per ton	$22.92
Net profit to company per ton	$20.99

The cost of the diamond drill work was 64 cents per foot. The average freight charges per ton, net weight, are $1.93 less this year and the average smelting charges per ton, net weight, are $2.15 less this year than last. The greatest expense was in the development, this accounting for 18.10 per cent of the whole. The cost of fuel was next being credited with 12.78 per cent and was closely followed by "hoisting and tramming," with 11.10 per cent. The total cost of running the mine for the thirteen months was $210,679.48.

ARIZONA.

Mining News: At Globe the company owning the mines is making extensive additions to its plant, among which is a 100-ton furnace.

The second payment on the Tucker mine, located about one and one-half miles northwest of Congress, has been made.

The *Oasis*: Development work on the Black Copper group, under bond to Fleming of Phœnix progresses in sinking a shaft on the Black Copper claim, now down 100 feet in ore.

Prescott *Courier*: The large tilting furnace of the United Verde Copper Company started up last week and made a successful run on copper precipitated from copper water.

At the Bland mine near Bumble Bee some very rich gold-bearing ore is being discovered. It is in streaks but the owner, Ex-Mayor Cushing of Omaha, expects soon to have enough developed to warrant the erection of a mill.

SOUTH AFRICA.

The July gold output of the Rand district was 203,873 ounces, an increase of 10,233 ounces over June.

At the Crown Reef, Johannesburg, results for July were: Number of days working 120-stamp mill, 29 days 11 hours; crushed by 120-stamp mill, 17,431 tons; yield in smelted gold from 120-stamp mill, 6508 ounces; yield in smelted gold from 120-stamp cyanide works, 4503 ounces; total, 11,011 ounces; working expenditure, 120-stamp mill and cyanide works, 17,431 tons milled; to mining, transport, milling, cyanide, general charges, maintenance and mine development, £23,154; revenue--by gold account—6508 ounces from 120-stamp mill, £22,299; 4503 ounces from 120-stamp cyanide works, £14,009; total, £36,308; profit for month, £13,154; revenue per ton crushed, £2 1s 7.91d; cost, £1 6s 6.80d; profit, 15s 1.11d.

AUSTRALIA.

The Mount Lyell Mining Company's head office at Melbourne reports that from June 25th to June 30th 2588 tons of crude ore--averaging about 6 per cent copper, 6 ounces 5 dwts. silver, 3⅛ dwts. gold per ton—were treated, producing 224 tons converter matte containing 114 tons copper, 9373 ounces silver, 320 ounces gold, and 129 tons first matte containing 28 tons copper, 1489 ounces silver, 78 ounces gold, which have yet to be reduced into converter matte, all worth £9975 at present London quotations. Cost of mining and smelting 2588 tons, £2555 13s, equal to 19s 9d per ton ore. Further costs per ton 12s 3d (it will be necessary to produce blister copper from converter matte) inclusive of all charges, treatment, shipment, realization in Europe, making present estimated total expense £1 12s per ton ore, leaving estimated profit £5884, equal to £2 5s 1d per ton of this class ore. Metallurgist reports pyritic smelting complete success.

The reports of the Broken Hill Proprietary Co. of New South Wales for the half year ending May 31st give some interesting data of that great enterprise.

The available quantity of payable oxidized ore averaging 15 ounces of silver and 12 per cent of lead was calculated at 1,250,000 tons which is a considerable increase on any previous figures. An estimate of the extent and quantity of the known and proved bodies of sulphides was given as 2,019,000 tons; assaying on an average 18.5 ounces silver, 24.5 per cent lead and 21.9 per cent zinc. A further quantity of 600,000 tons is considered to be within these limits, but its extent has not yet been fully determined by the present prospecting operations.

It is the intention of the management to erect a concentration plant of 5000 tons weekly capacity, in order to obtain a suitable product from the sulphides for smelting in conjunction with the remaining oxidized ores. The plans, which provide for an enlargement up to 10,000 tons, have been prepared, and the work of erection will shortly commence, and should be completed before the end of the year.

The following figures are given showing work done:

Total ore raised		277,881 tons
" Crosscutting and driving		8819 feet
" Rises and winzes		1,479 "
" Shaft sinking		192 "

The whole of the products from the mine now pass through the reduction works and the publication of future yields will be based in the output of that establishment being estimated and announced every four weeks.

The total amount of dividends paid since organization is £6,040,000. The amount expended in construction with the formation of the company has been £710,431.

The expenditures on working account for the six months was £466,992 and the gross profits for the same time £281,735. The amount paid in dividends was £288,000.

The water used at the mine for various seasons has been as follows:

	Gallons.
From the Company's dams	10,980,000
Acacia Basin	3,061,200
Boken Hill Water Supply	25,497,000
Total	39,539 100

Horses have lately been introduced underground for hauling trucks, and, when the requisite sidings and other facilities are complete, a substantial saving may be expected.

Following is a statement of gross quantity of ore treated, showing silver and lead produced:

	Gross Ore Treated.		Fine Silver Produced.	Lead.
Mine Furnaces	120,484		2,597,218	9,357
Port Pirie Furnaces	38,478		701,378	1,836
Refinery Furnace (Port Pirie)	7,277		157,907	126
British Co.'s Furnaces (Broken Hill), to Jan. 30, 1896	7,810		146,162	463
	174,049		3,602,665	11,783
Passed through Lixiviation Plant	29,469		288,582	175
Result of clean-up at Amalgamation Plant			1,094	...
	203,518		3,892,341	11,958
Passed through Concentration Plant, tons	21,201			
Producing Concentrates (included in gross ore treated in mine furnaces	3,812			
And tailings and zinc middlings	17,389	17,389	....	....
	21,201			
Copper Matte—				
Produced at mine furn's, tons	1,406	183	160,659	
At Port Pirie furnaces	249	53	34,540	
At Refinery furnace	123	44	17,209	
At British Co. furnaces	23	4	2,829	
	1,801	284		
Total		220,907	4,107,578	11,958
Deduct Fine Dust—Mine Furnaces	1,154			
Port Pirie Fur's.	857			
Refinery Furn'e.	18			
British Co.'s F's.	436			
Total	2,465			
Deduct By-Products, Etc.—Lixiviation Plant (Carbonate of Le'd Precipitate)	352			
Amalgam't'n Plant (Pan scale)	2			
British Furnaces (Bricks)	66	2,885		
Totals		218,022	4,107,578	11,958

The products obtained from the different treatment plants have been as follows:

Plant.	Material.	Fine Silver, Ounces.	Lead, Tons.	Copper, Tons.
Mine furnaces	Bullion	2,597 218	9,357	...
	Matte	160,659	....	183
British furnaces	Bullion	146.162	463	...
	Matte	2,829	....	4
Port Pirie furnaces	Bullion	701,378	1,837	...
	Matte	34,540	....	53
Refinery furnace	Bullion	157,907	126	..
	Matte	17,209	....	44
Leaching plant	Bullion	288,582	175	.
Amalgam'g plant	Bullion	1,094	....	..
Totals		4,107,578	11,958	284

The refinery has treated 12,580 tons of silver-lead bullion (including all bullion produced to 28th May) yielding:

Product.	Fine Silver, Ounces.	Lead, Tons.	Gold, Ounces.
In Silver Bullion	3,488,179	....	.....
In Dore Bullion	721,006¾	....	3,817.345
In Lead, China Bars	.....	7,444	.....
In Lead, Ordinary Bars	.....	4,367	.....
In Antimonial Metal	.....	380	.....
Totals	4,209,185¾	12,191	3,817.345

The gross receipts of the Mount Morgan Company during the past year were £578,677, out of which £300,000 was paid in dividends, £6154 in royalty, and £11,734 added to the bullion reserve.

At the Mount Morgan mine, Queensland, results for the month of July were: Tons chlorinated, 9786; gold returned, 13,090 ounces.

Coast Industrial Notes.

—The farmers of Monterey are pledging acreages for the cultivation of beets in order to secure the erection of a sugar factory.

—Five years ago not over 20 carloads of refined salt were shipped out of Utah. Now the business amounts to 1500 carloads annually.

—It is proposed by the Sunset Telephone Company to organize a system between Yuba City and Colusa, via Sutter City, Meridian and West Butte.

—The sugar mill at Alvarado began a five month's run last Tuesday with about 100 men. The acreage of beets available this year is 3800 acres against 3000 for last year.

—The Grizzly Bluff creamery, at Ferndale, the largest in Eel river valley, with a capacity of 2000 pounds of butter and as much cheese per day, was destroyed by fire last week.

—The receipts of lumber at the port of San Francisco for the first six months of this year aggregated 194,630,299 feet, as follows: Pine, 125,995,673; redwood, 64,030,482; spruce, 4,418,884; cedar, 163,000; maple, 8,160; ash, 14,100.

—The owners of the electric power and lighting plant at Sonora, Tuolumne county—Messrs. Crooks & Jarboe—propose to expend $50,000 in improving the plant and have decided to furnish the power needed direct from the river.

—The Electric Power Company of Grass Valley are enlarging their dam on the South Yuba and increasing the capacity of their flume. Their connections have been made with the new plant to run the Gold Hill mine, which is about ready to start up.

—Thomas S. Bullock, the New York capitalist, who proposes to run a railroad from Stockton into the mining region of the Sierras, is in that city. Nearly eighty miles of rails have arrived for the purpose. It is not certain to what point it is proposed to run the road.

—A representative of Claus Spreckels has been interviewing the farmers in the neighborhood of Sacramento with a view to inducing them to make tests of their ground to determine whether it is suitable for raising sugar beets. He says that if 30,000 acres of good ground could be obtained for the purpose and the farmers would agree to plant, a factory would be started by Mr. Spreckels.

—The present output of the Los Angeles oil wells is estimated at 50,000 barrels per month. There has been an increase of consumption, the surplus has decreased and the market has become stronger, prices ranging from $1 to $1.15 per barrel, paid producers at the well tanks. Eight months ago no oil was being produced west of Belmont avenue, and now nearly one-half the entire product comes from that district. Nearly all the wells in the old district are falling off.

—Grocers handling filled cheese are being notified by the internal revenue office to get their product out of the way before next Friday, or to have it stamped and pay the tax on it before that day. The recent enactment of Congress on filled cheese goes into effect at that time. The stuff will have to pay a tax of 1 cent a pound. The retail dealer must pay an annual fee of $8. The cheese must be stamped on top, bottom and around the outside with black letters, and, in addition, the grocer or retailer must display a sign with letters 6 inches long, "Filled Cheese Sold Here." Failure to have the cheese stamped and marked, or failure to pay the annual fee before that time, renders the dealer liable to a fine of $50 and the cheese to confiscation.

Personal.

JOHN D. LUDWIG has returned to Mariposa county from the East.

JAMES H. TIBBETTS, of Calaveras, who went to South Africa as a mine manager about 18 months ago, is on his way home.

LOUIS P. DEVAT, of Paris, one of the owners in the Flagstaff quartz and Clark creek placer mines in southern Oregon, has come out to visit the properties.

A. B. WOOD, who was one of the men who started Leadville and who is interested in the copper mines of Michigan, is here with a view to looking for California investments.

W. S. EDWARDS, who has been for several years general manager of the Silver King mines in Calico, recently arrived from London and left last Saturday for Guatemala, to inspect some coffee plantations and with a view to settling there.

GARDINER F. WILLIAMS, manager of the De Beers diamond mines in Kimberley, South Africa, was reported to have given up his position with the intention of coming to California to remain. This is not true. Mr. Williams will remain here a few weeks visiting his relations in Oakland and then return to Kimberley.

Recent California Mining Incorporations.

Draper-Whitt G. M. Co., Oakland; capital stock, $300,000, $15 subscribed.

Gold Ledge Consolidated Mining Company, Santa Rosa, Sonoma county; L. F. Hodge, H. L. Tripp, A. J. Burnett, A. W. Arnold and M. V. Vanderhoof, all of Santa Rosa; capital stock, $500,000.

Yellow Metal Mining Company, San Francisco, capital stock, $1,000,000, $35,000 subscribed; H. O. Sterns, W. Rutledge, J. S. Eastman, A. M. Taylor, A. E. Williams, W. T. Bell, L. Thors.

At the annual meeting of the California Association of Civil Engineers on the 21st inst., at their rooms in the Academy of Science building, S. F, the following officers were elected for the ensuing term: President, Fred T. Newbery, San Francisco; vice-president, L. J. Le Conte, Oakland; directors—George F. Allardt, Oakland; Charles D. Marx, Stanford University; Herman Kower, University of California; Carl Uhlig, San Francisco; George L. Nusbaumer, Oakland.

Commercial Paragraphs.

THE California Electrical Works has this week established itself in new and commodious quarters, 409 Market street. Five floors and basement with frontage of 30 feet and depth of 150 feet will doubtless give the company room to carry on its business. The company is prepared to contract for the building of power transmission and electric lighting plants on any scale. The business management of the house is in the hands of G. D. Greenwood whose knowledge of all branches of electrical work is thorough, and who has a record for push and enterprise.

FROM Fraser & Chalmers, Chicago, are received circulars 1 to 15 and catalogues 24, 46, 32, 36, 51 and 52, covering chiefly further data of the success of the Bridgman sampler, the introduction of the Otto aerial tramway, already firmly established in European favor, the introduction of a dry placer miner (Woods), which has given good results, the Alsing pulverizer for fine grinding on gold ores, enamel, etc., a record test of one of their triple expansion Corliss engines, a preliminary circular on a new line of small steam hoists, a stamp-milling record by their Alaska-Mexican battery, and reports of saving and results in the use of Riedler compressors and pumps, Comet adjustable crushers and Browne hydrometric sizers in connection with Frue vanners.

Recently Declared Mining Dividends.

Isabella mine, Colorado, $23,500, Aug. 25th.
Ontario mine, Utah, $15,000, Aug. 31st.
Silver King mine, Utah, $37,500, Aug. 7th.
Slocan Star mine, B. C., $100,000 on Sept. 1.
Utah mine, Utah, $2000, Aug. 10th.
Galena mine, Utah, $5000, Aug. 10th.
Gold Coin mine, Colorado, $20,000, Aug. 10th.
The Little Jessie, Yavapai county, Arizona, $5000, Aug. 25th.
Homestake Mining Company, Deadwood, S. D., $31,500, Aug. 25th.
Wasp Mining Company, Deadwood, S. D., $20,000, Aug. 18th.
Mammoth Mining Company, Utah, $20,000, Aug. 25th.
Helena & Frisco Mining Co., Helena, Montana, four cents per share, $20,000, Aug. 22d.
Bullion-Beck and Champion mine, Utah, $15,000, Aug. 6th.
Deadwood-Terra M. Co., South Dakota, 50 cents per share, $100,000, Aug. 20th.

Obituary.

JOHN C. ARNOLD, United States Surveyor-General of Oregon, died at his home in Portland last Monday.

CAPT. J. W. PLUMMER, well and widely known, died in London on the 19th inst. He was manager of the DeLamar, Idaho, mine and a skillful miner. The mine that he managed crushed 4,261 tons ore last month, realizing $61,215, and a net profit of $19,074.

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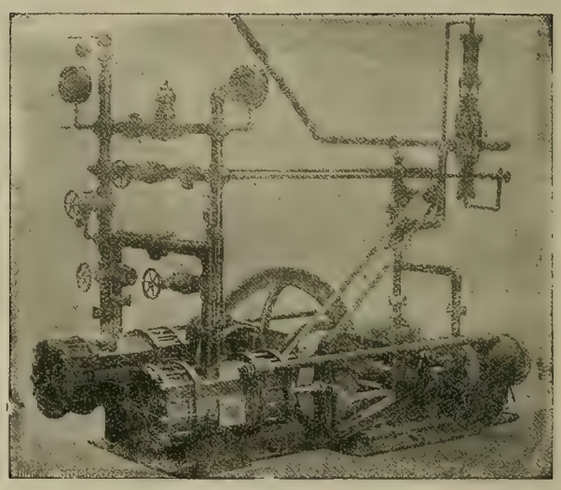

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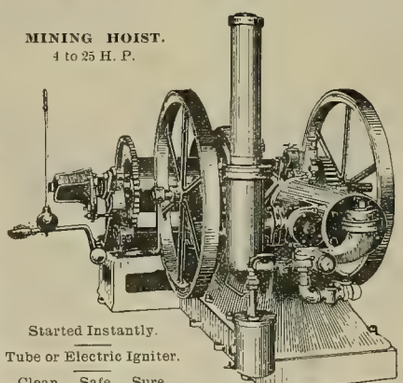

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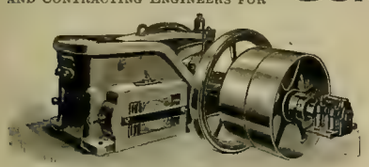

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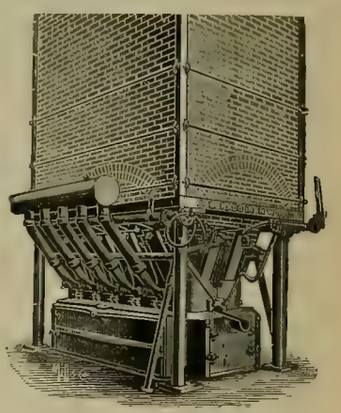

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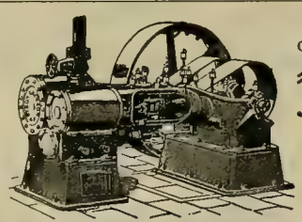

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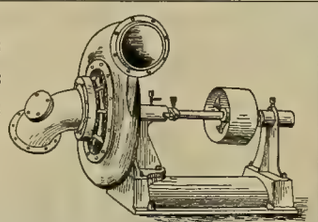

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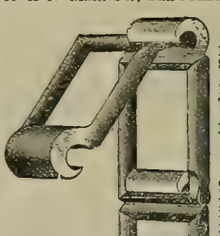

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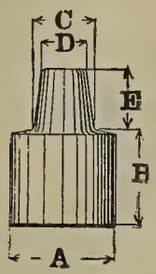

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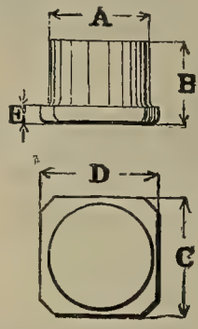

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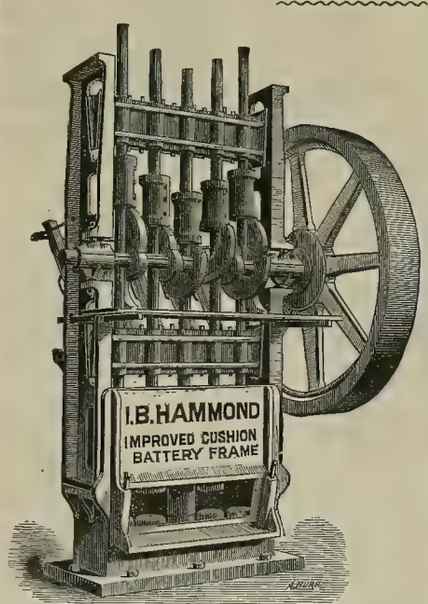

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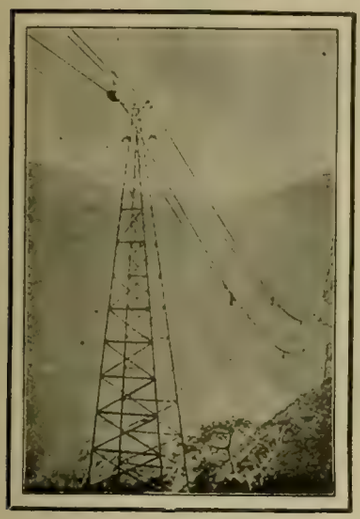

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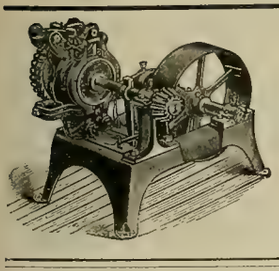

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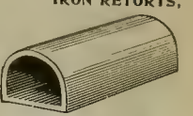

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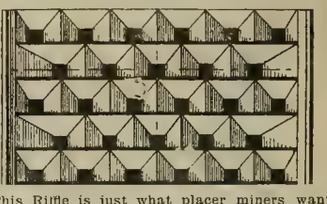

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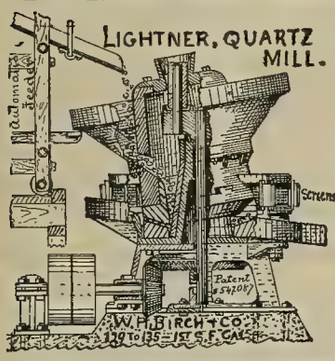

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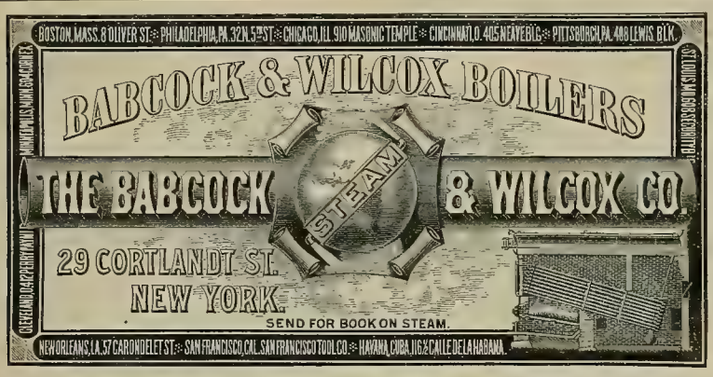
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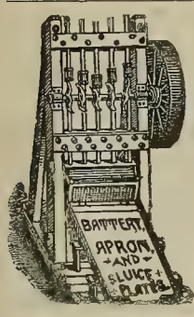

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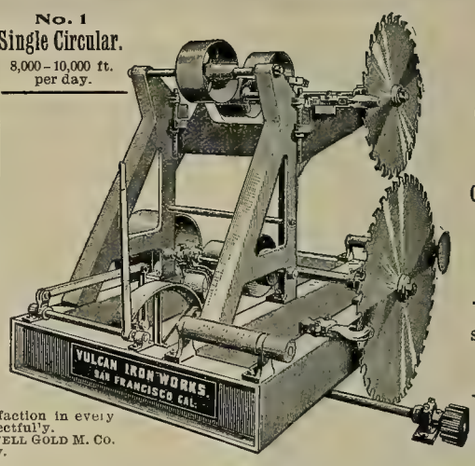

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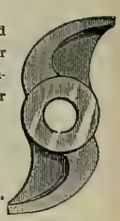

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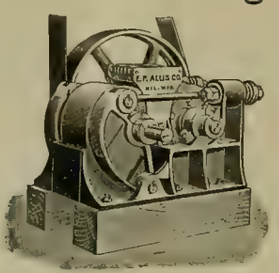

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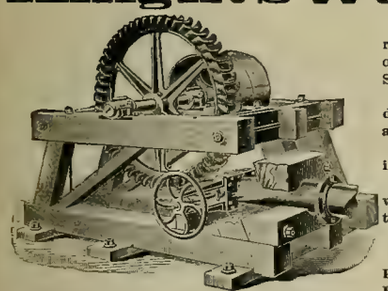

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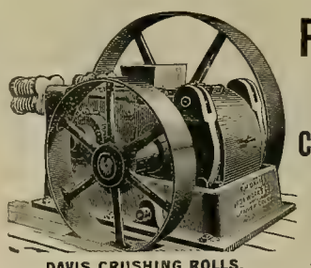

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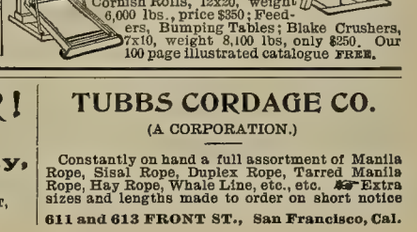

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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 27, 1896.

Jobbers, as a rule, are astonished at the footing of sales so far in this month. Notwithstanding the low average of values of goods handled, still they aggregate larger in value than in the corresponding month of last year, and as for that, for several years past. While the consumption demand does not show any increase from the agricultural sections that from the gold mining districts on the coast show a most decided increase. Had it not been for the revival in gold mining business interests in this city, and as for that, on the coast, would have suffered very severely owing to the low and unsatisfactory prices that have ruled for farm products. With iron workers business continues good, larger than at this time last year. So far as we can learn there are not many new orders for machinery, structural and railroad materials, but those in hand will take sometime to clean up.

The local money market is said to be working close, with a fair call for funds for crop moving purposes. The closeness of the market is due more to banks hoarding money than from any other source, therefore it is largely artificial. The receipts of gold from the mines aggregate over $2,000,000 a month which goes into general circulation and helps to relieve the situation. The call for funds for both business and speculative purposes is light which shows a fair degree of ease in business circles. At the East the money markets are still working close but this will be relieved by imports of gold from Europe which, it is stated, will aggregate from $10,000,000 to $20,000,000. The demand is increasing for crop moving purposes. The later call is taking increased quantities of standard silver dollars. Over $2,500,000 went out for the four weeks ending with August 15th. The balance of foreign trade is largely in favor of the United States as will be seen by the following: For the seven months ending July 31st the imports of merchandise into the United States aggregated in 1896, $421,583,123 against $464,625,876 in 1895; showing a decrease of $43,042,753. The exports of merchandise during the same period of time aggregate in 1896, $512,326,732 against $443,406,784 in 1895; showing an increase of $68,919,948. The exports over imports for the seven months of 1896 aggregate in value $90,743,609.

New York Silver Prices.

NEW YORK, Aug. 27.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	30 13-16	66⅞
Saturday	30 11-16	66½
Monday	30⅝	66⅜
Tuesday	30⅝	66⅜
Wednesday	30 11-16	65½
Thursday	30 11-16	66¼

	Copper.	Lead.	Iron.	Tin
Friday	10 75	2 65	10 25@12 50	13 35
Saturday	10 75	2 65	10 25@12 50	13 35
Monday	10 70	2 65	10 25@12 50	13 30
Tuesday	10 70	2 65	10 25@12 00	13 25
Wednesday	10 70	2 65	10 25@12 00	13 25

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	Par
New York Telegraphic Transfer	Par
London Bankers' 60 days	$486
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	66⅝
Mexican Dollars	53@53½c

Eastern exchanges are nominal.

SILVER.—The market sold down but towards the close it is stronger both at home and abroad. The decline is not due to increased productions but it is stated by Eastern exchanges to have been brought about by large offerings from this side to Europe, and as the demand abroad is slack buyers bid down. So far the free coinage agitation has had an unfavorable effect on silver bullion. In our market and also at the East the export demand is light.

Pixley & Abell report exports of silver from London to India, China and the Straits for the year to August 1st as follows:

	India.	China.	Straits.	Total.
1896.	£2,175,578	£574,413	£545,386	£3,295,677
1895.	2,251,580	1,100,767	512,703	3,865,050

MEXICAN DOLLARS.—The demand continues light, which usually obtains when silver is down. There is a good supply on the market.

COPPER.—The market at the East has fallen to still lower figures. At the decline there seems to be a slightly better export movement. It is stated that consumers abroad have their temporary wants well supplied, but will begin to go into the market more freely towards the close of September. If this proves correct, an improvement in prices can be looked for. The demand in this country is still light and not much of an increase is looked for until November.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The market is essentially unchanged.

Domestic trade, per flask	36 00

For export quotations are nominal, but less than for home.

LEAD.—The local market favors buyers. At the East low prices continue to be reported with a light demand ruling. Stocks abroad are excessive and markets heavy.

Our market is quoted as follows:

Pig	—	@	3 65
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50
SHOT.—The demand will soon start up again; at present it is dull.			
Drop, sizes smaller than B, per bag of 25 lbs			$1 20
Drop, B and larger sizes, " "			1 45
Buck, Balls and Chilled, do, " "			1 45

ANTIMONY.—The demand is fair, with the market steady at 7¾@8¼c in a jobbing way. New York mail advices quote 7¾@7½c for Cookson's, 6½c for Hallett's and 6½c for Japanese, from store.

TIN.—The market continues to rule in buyers' favor both on this coast and at the East in sympathy with lower prices abroad for pig tin owing to lower prices for silver.

The market is quoted as follows in jobbing lots:

Pig, per lb	14
Plate, I C coke, heavy, per box	$4 10@ —
" " " light, "	4 00@ —

BORAX.—There is a good demand for shipment East.

Refined, in car lots	6⅜
Refined, in sacks	5⅜
Powdered, in car lots	5¼
Concentrated, "	5⅝

POWDER.—The market is practically unchanged.

The market is quoted as follows

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

IRON.—Some shading is reported in sympathy with lower offers to arrive and for shipment. The consumption is reported to be fairly free.

COAL.—Some cutting is reported for spot, to arrive and for shipment. Offerings of Pacific coast coals are liberal, which operates against foreign.

COKE.—The market is quoted as follows:

Gas Companies'	—	@	—
English, to load	8 00	@	—
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	—
Cumberland	—	@	—

LUMBER.—There is a continued good export demand, but for home consumption the call is light.

Redwood, Fluming	17 00	@	—
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—Buying continues in a hand-to-mouth way. Dealers carry light stocks, fearing a decline in prices.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, Aug. 27, 1896.

The market has been devoid of any feature deserving of special notice. The fluctuation in prices have not been more than about 5 per cent. Why the market has been kept in this condition causes comment with outside operators, but no satisfactory reason has been given, except that inside operators are too busy with the silver question to give attention to mining shares and therefore instructed their brokers not to do anything outside of keeping the market from falling to pieces. Another set of operators say that the blackboard prices are due to a desire of insiders to disgust outsiders and get them to sell under assessment scares, bear points of lower prices and not have anything done at the mines calculated to cause buying by the latter. It would seem as if the latter is being done, which, if correct, gives color to reports that the situation at the mines is very much better than the true inside moneyed men wish to have known. That there seems to be a regular genuine freeze-out game going on can not be denied, for there are no fluctuations, while the market is made to look sick and heavy, as if ready to break at any moment. Heretofore when it hung as at present, prices were sent lower before an upmove. The setback was made to get in all the margins possible; but now margin accounts are light, for buyers have purchased more for cash than before known. It is these the inside appears to want and which they have reason to think can be had by assessments and no favorable official reports from the mines calculated to cause holding. As usual, in some of the mines they are not extracting ore and are either stopping work or else are laying off men, claiming there is no water in the Carson river to run the mills. At the season of the year when there is water there is no ore, and when there is ore or a chance of getting it there is no water. This makes shrewd operators think it is shares, and not ore, that are wanted. It is the current belief that after election things will change for the better, for by that time the public will have considerable less shares and conditions will be more favorable for a deal. While this is the general belief, there are some who think that a small upmove will come first, to be followed by quite a setback. Which is right, or whether both are slightly correct or wrong, the writer can not say, but it does seem as if some of the shares at present low prices would do to buy for higher prices later on. The market never fails to rally and make quite an advance after each depression and low prices.

The news from the Comstock mines is of an unimportant character. The work to which public attention is attracted is not calculated to result in anything of much value; or if it does, it is not at all unlikely but the information will be withheld for stock-jobbing operation. This has been the case heretofore with insiders, and it is reasonable to conclude they have not had a change of heart. In Alta the wrize continues in ore as they sink on the Keystone ledge. Overman is still taking out a few tons of ore a week, but no mention is made in official letters of a strike or of the general character of the work that is being done. Seg. Belcher and also Belcher are raising ore each week, but no information is given as to where they are working or the nature of the work. Possibly this will be done after assessments have been collected. In Crown Point they have laid off men on the specious plea that there is no water in the Carson river to run the mill so as to crush ore. This is an indirect way of admitting they have ore which will pay to extract and mill. The rainy season will be here soon. No news comes to hand from Yellow Jacket. In Confidence they are still fooling around the ore which they struck and skirted some time ago, but it looks as if nothing will be done with it until the assessment is off the shares. The same remarks are applicable to Challenge. The long west crossdrift in Con. Imperial run jointly by Challenge, Confidence and Con. Imperial, is being extended slowly. It looks as if they fear that the west lode will be struck too soon if work should be pushed. The No. 3 crossdrift to the west is also being extended slowly. Official letters from Alpha do not report any material change. So far they do not report re-finding the ore struck to the west some four or five years ago in the level above where they are at work. From Bullion nothing new comes to hand and nothing expected until the assessment is off. In Potosi and also Chollar they are working on the same levels heretofore published. The former is not extracting ore, but the latter is taking out over 100 tons a week assaying over $25 a ton, which assists in paying expenses. In Hale & Norcross the work is of an exploiting character, and on the levels heretofore published. A few tons of ore are raised each week. In Savage the work is on the same levels and direction published the past three weeks. The joint east crossdrift from the Bonner shaft is being extended by Gould & Curry and Best & Belcher. Some think well of this work. The work in Con. Virginia which seems to attract attention is that to the east on the 1650-foot level. This is quite a gamble and may turn out much better than the many believe. That ore will be struck cannot be doubted, but how much and how high a grade no one knows and therefore the gamble. The work at other points in the mine is on the same levels they have been working for some time. The ore raised the past week was over 140 tons, assaying over $45 a ton. They are milling ore, but the battery assays are not as high as it was thought they would be, judging from the car-sample assays. The work in Ophir is still on the central tunnel and 1000-foot levels and to the west. In Mexican work is still to the west on the 1000-foot level. Union has levied a 20-cent assessment. It is said that if this drives in enough shares they will be able to find ore. The work in this mine and also Sierra Nevada is unchanged, with none expected until the assessments are off.

The Dazet mill, under the management of James Cronan, worked for the Hale & Norcross Mining Company during July, 1896, 238½ tons of ore which yielded $5,044.30 in gold coin. His official statement shows that the mill saved 100 9-10 per cent of the battery assays and 77 3-10 per cent of the feeder assays. The total amount of gold in the 238½ tons, as shown by the battery assays, was $2,146.50 or $9 per ton, but as the United States mint at Carson returned the company $3,577.38 or $15 per ton in gold it follows that the battery assays do not show all the gold contained in the ores. If $1430.80 can be saved in gold alone from 238½ tons of ore as between battery assays and actual yield then other mill men on the Comstock should be more careful in the future to see that it be done for their respective companies. Under the new management the Hale & Norcross Company has made several reforms in the interest of shareholders and set an example in other directions deserving of following by other companies.

From the Brunswick lode there is nothing of special interest to report. The work in Occidental is about the same as given last week as is that in Chollar, Hale & Norcross, Savage, Gold & Curry and Best & Belcher. In Chollar it is stated they will raise the 6-foot ore found on the 300-foot level. In Hale & Norcross they will soon be down to the 400-foot level. Drifting south will be commenced in about ten or fourteen days. This work, it is expected, will give good results. An unconfirmed report is on the street of an improvement in the winze.

From the Bodie district there is nothing new to report. The work is on the same levels and directions heretofore published. Some ore is being found raised in Bulwer, Bodie and Standard. Active exploiting is being done. The drift run by Mono from the Bodie 400-foot level, is being pushed ahead towards the Fortuna ledge. There is some talk of the Tuscaroras come to the front again.

The market was dull with the brokers, like small boys passing through a graveyard, making a noise to keep their courage up. The only strong stock was Occidental. It is expected that a joint crosscut will be started soon by Savage and Hale & Norcross on the 300-foot level Brunswick lode. Good results are looked for.

The following illustrates the changes of the week:

Mines.	Aug. 20.	Aug. 27.
Alpha		
Alta Consolidated	$ 07	$ 10
Andes		31
Belcher	29	26
Best & Belcher	1 10	1 05
Bodie	56	66
Bullion	08	08
Challenge		
Chollar	2 15	2 05
Confidence		
Consolidated California and Virginia	1 95	1 85
Consolidated New York		
Crown Point	26	
Exchequer		
Gould & Curry	57	
Hale & Norcross	1 25	1 35
Justice		
Mexican		53
Ophir	1 05	
Overman		13
Potosi	92	90
Savage	55	56
Sierra Nevada	45	43
Union		33
Utah		07
Yellow Jacket	34	

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alpha Con M & M Co, Nev	17	10c	Aug 3	Sept 7..Sept 29	C E Elliott, 309 Montgomery
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24	Sept 24..Oct 24	E D Farish, 632 Market
Anita G M Co, Cal	10	7c	July 20	Aug 25..Sept 15	L F Reichling, 404 Montgomery
Bay State M & D Co, Cal	33	3c	Aug 21	Sept 30..Oct 20	F E Luty, 330 Pine
Bullion Mining Co, Nev	42	10c	Aug 14	Sept 15..Oct 8	R R Grayson, 331 Pine
Belcher S M Co, Nev	53	25c	Aug 5	Sept 10..Sept 30	C L Perkins, Mills Building
Confidence S M Co, Nev	27	30c	July 30	Sept 3..Sept 24	A S Groth, 414 California
Con Imperial M Co, Nev	37	1c	July 24	Aug 27..Sept 22	C L McCoy, Mills Building
Crown Point M Co, Nev	68	20c	Aug 18	Sept 23..Oct 13	J Newlands, Mills Building
Gold Bar Con M Co, Cal	4	2c	July 13	Aug 20..Sept 21	E C Godfrey, Crocker Bldg
Jamison M Co, Cal	8	5c	July 6	Sept 7..Sept 28	Sam W Cheyney, 120 Sutter
Reward G M Co, Cal	1	3c	Aug 8	Sept 14..Oct 5	J Stadtfeld, 309 Montgomery
Sierra S M Co, Nev	111	25c	Aug 7	Sept 11..Oct 1	E L Parker, 309 Montgomery
Union Con S M Co, Nev	53	20c	Aug 25	Sept 28..Oct 22	A P Swain, 309 Montgomery

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Home G M Co, Cal	O E Johnson, 316 Front	Sept 1
Old Flag M Co, Cal	F L Olmsted, 315 Montgomery	Sept 8

San Francisco Stock Board Sales.

SAN FRANCISCO, August 27, 1896

9:30 A. M. SESSION.

500 Alta	10	250 H. & N.	1 5
100 Andes	31	50 Occidental	62
100 Belcher	26	100 Potosi	90
100 Bodie	66	300 Savage	56
300 Bullion	08	300 Sierra Nevada	43
400 Chollar	2 05	100 Union	33
200 Con Cal & Va	1 85		

SECOND SESSION—2:30 P. M.

500 Best & Belcher	1 05	100 Overman	13
150 Savage	53	100 Union	33
200 Chollar	2 05	100 Occidental	66
200 Potosi	90	250 Bodie	61
100 H. & N.	1 35	100 Mexican	53
100 Utah	07		

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUGUST 18, 1896.

566,265—CAN OPENER—H Baldridge, San Bernardino, Cal

566,133—HEATING FURNACE—F. E Browne Los Angeles, Cal

565,995—TELEPHONE REGISTER—John Curran, S. F.

566,267—HAT CREASER—P. S. Dusenburg, Oakland, Cal.

566,073—DRAFT REGULATOR—J. S. Fox, Oakland, Cal

566,269—ACCORDION—J. Galleazzi, S. F.

566,075—ENVELOPE THREADING MACHINE—M. Grube, S. F.

565,978—PORTABLE LOCK—G. W. Haas, S. F.

566,175—DUMPING WAGON—J. G. Holcombe, Newport, Or.

566,070—SOLDERING MACHINE—A. Johnson, Oakland, Cal.

565,992—MILLING MACHINE—E. Johnson, Seattle, Wash

566,201—BICYCLE—Mackinnon & Gage, Seattle, Wash.

566,082—HOP TWINER—R. R. Parrish, Independence, Or.

566,221—TROUSERS STRETCHER—F. G. Petersen, Seattle, Wash.

566,225—CAR FENDER—F. Reeve, Stockton, Cal.

566,007—SEAMING MACHINE—H Schanke, S. F.

566,144—INVALID'S BED—J. B. Young, Pasadena, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DRAFT REGULATORS.—John S. Fox, Oakland, Cal. No. 566,073. Dated Aug. 18, 1896. This invention is especially designed to be used in connection with heating furnaces having a number of hot and cold air passages leading to various rooms to be heated, and in which it is necessary to regulate the supply of air to any one room and proportion it properly. In such apparatus it is found that the hot air will, when the fire is started, often go to certain rooms, while the others will be left with little or no supply for a long time, and it is difficult to remedy this matter without visiting the rooms and ascertaining the condition of each one, especially in school-houses having many large recitation rooms to be heated by hot air. The invention consists of an arrangement of dampers, a propelling wheel driven by the current of moving air, and connections between the dampers and the wheel shaft whereby the movement of the wheel will operate to open or close the dampers as may be necessary.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from W. A. Keefer, in the Alcyone Mine, near San Andreas, Calaveras Co., to deposit tailings in San Domingo Creek, and from J. R. Sears, in the French Claim, near Indian Diggings, El Dorado Co., to deposit tailings on the bank of Clear Creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on September 14, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from George Beattie, in the Beattie and Parsons Mines, near Georgetown, El Dorado Co., to deposit tailings in Big Canyon Creek, and from Richard Phelan, in the Hilda Mine, near Sierra City, Sierra Co., to deposit tailings in a ravine, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on August 31st, 1896, at 1:30 P. M.

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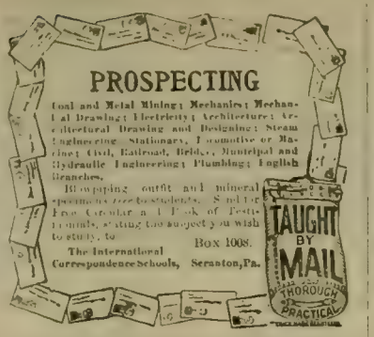
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Assessment Notices.

BELCHER SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 5th day of August, 1896, an assessment (No. 55) of twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 37, third floor, Mills Building, N. E. corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of September, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on WEDNESDAY, the 30th day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
C. L. PERKINS, Secretary.

Office—Room 37, third floor, Mills Building, N. E. corner Bush and Montgomery streets, San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Little Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 8) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 31st day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

POSTPONEMENT.

At a meeting of the Board of Directors o the Jamison Mining Company, held on the 22nd day of July, 1896, it was resolved that any stock upon which the assessment shall remain unpaid on the seventh day of September, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, September 28th, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

SAM W. CHEYNEY, Secretary.

ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California; location of works, Kelso, Cowlitz county, Washington.

Notice is hereby given that at a meeting of the Board of Directors held on the 24th day of August, 1896, an assessment (No. 7) of Three Cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market Street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-fourth (24th) day of September, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the twenty-fourth (24th) day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

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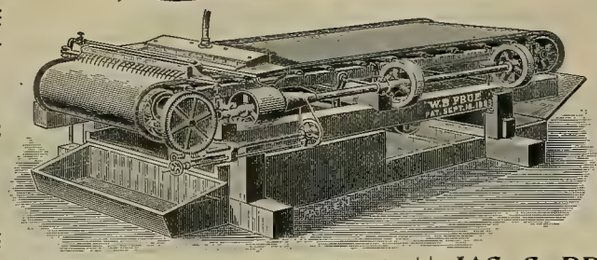

It can be safely stated, without going into a description of several new and untried concentrators that have lately come into the market, that where sulphurets are of such value as to make close saving necessary, the Frue Vanner is always used. It is the only endless belt concentrator in the market that can be relied on to handle all classes of ores, and give universal satisfaction. (In all competition of concentrators the Frue Vanner is taken as the standard machine of the world and all comparisons made by it. There have been over 4200 of these machines sold, 1700 having been sold on the Pacific coast alone.) They are in use in every part of the world where mining is carried on and in all cases they are giving perfect satisfaction. From time to time valuable and important improvements have been made in this machine to increase its capacity and durability, and particular attention is called to the Patent Lip Flange for the rubber belt, which does away with nearly all the strain and cracking, as in the old style of flange, making the life of belt more than double that of other style belts in the market. The lip of flange bends outward in going over the large end rolls, thereby distributing the strain in the solid rubber, and bringing virtually no strain either at the edge or at the base of flange, as is the case in all belts with a raised edge.

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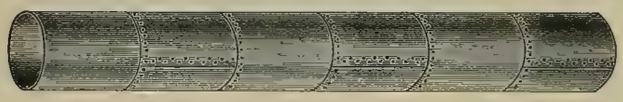

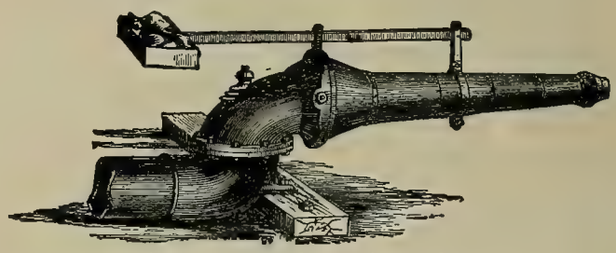

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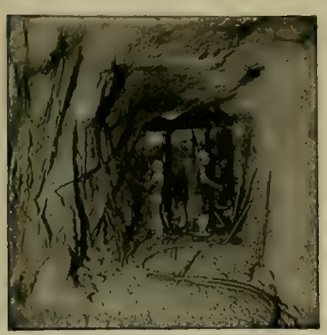
MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1887.—VOLUME LXXIII. Number 10. SAN FRANCISCO, SATURDAY, SEPTEMBER 5, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

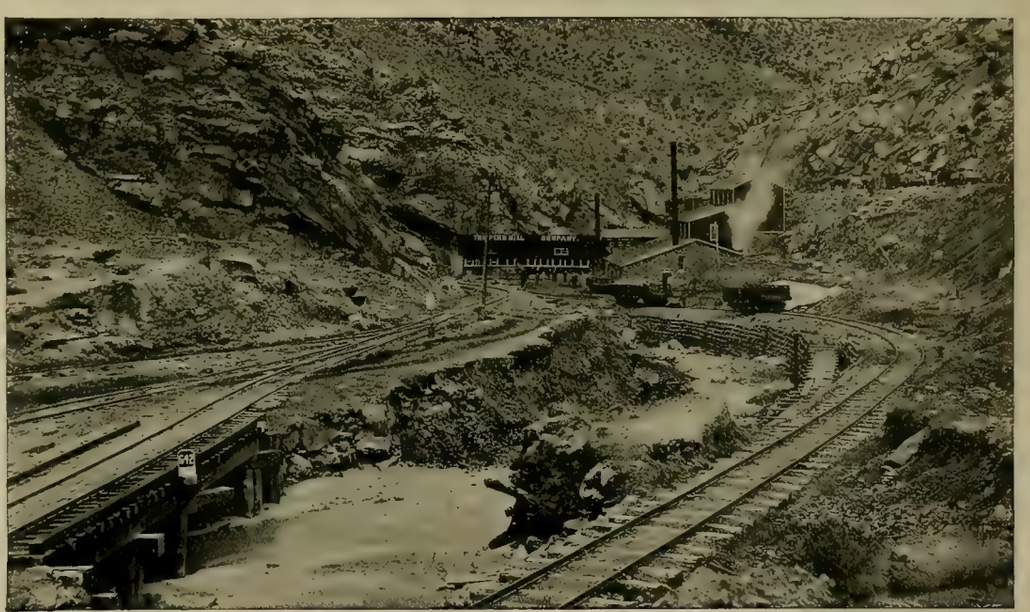
Handsome and Effective Advertising.

This is the age of advertising. Whether it be a wheelbarrow or a bicycle, a dry washer or a steam engine, a mine or a railroad, it can best be served by judicious advertising. We of California have not yet discovered that, or knowing it do not act upon it. Other communities have. Realizing that the simple possession of a good thing does not imply general knowledge of the fact, our sister commonwealths are apprising the world of what they have for sale, and are using printers' ink freely. In these days of the prominence of the mining industry, when that form of commercial business leads all others, it is to be expected that mining receives the greatest quantity and secures the finest forms of advertising. In Colorado, Utah, Montana and Washington the railroads are doing a good deal to advertise the mining resources of the country from whose advancement they expect to derive business and whose prosperity is in exact proportion to their own. The railroads running through those States are issuing splendid specimens of the printer's art, calling attention to the mineral resources of the country they traverse, and incidentally, the ease of access afforded by the particular road described. It is to be said that for every line advertising the railroad there is a page advertising the country through which the railroad runs. The contrast between this liberal policy and the California roads is marked. So far as advertising goes one would never know from a Central Pacific or Southern Pacific or A. & P. publication that there was such a thing as a mine in California. This, however, is characteristic. It has, apparently, been the constant custom if not the policy of the railroads centering in San Francisco to ignore all efforts at advertising the State's mineral resources. The idea seems to be that while occasionally nuts, oranges, figs, grapes and lemons are given a word of mention in railroad literature, the fact that California is the greatest gold field and leading gold producer in the world must be studiously and sedulously suppressed.



BREAST OF NEWHOUSE TUNNEL, ONE MILE FROM ENTRANCE.

LINCOLN MINE, IDAHO SPRINGS.



THE PENN MILL, NEAR BLACK HAWK.

PROSPECTING NEAR LEADVILLE, COLORADO.

In striking contrast to this apathy and mistaken custom is the action of the Colorado railroads. They realize that their profit and continued prosperity lies largely in the development of that State's mineral wealth. They understand that whenever a mining property is developed, or a new camp opened up, that means big freight and passenger business, and, accordingly, they let the world know what they have. In these days of brilliant advertising few forms of that art have received finer exemplification than in the literature issued by the Colorado railroads this summer. Apart from some slight exaggeration and overstatement there is so manifest a desire to exhibit and set forth the mineral resources of the State in a way calculated to interest and impress the general reader that the few misstatements can be passed over in silence. So far, one of the finest that has fallen under the writer's observation is a brochure, "Colorado's Gold," superbly produced by B. L. Winchell, the general passenger agent of the Gulf Road and South Park Line, Denver, Colorado. Some of the illustrations are herewith produced. The

(Continued on page 193.)

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, September 5, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Breast of Newhouse Tunnel, One Mile from Entrance; Lincoln Mine, Idaho Springs; The Penn Mill, near Black Hawk; Prospecting near Leadville, Colorado, 189. The Cradle Being Filled with Logs; The Raft in Tow of Tug with River Steamer to Assist in Rounding Turns in River, 192. American Placer, Newlin's Gulch; Newhouse Tunnel, Idaho Springs; Interior of Mineral Palace, Pueblo, Col., 193.

EDITORIAL.—Handsome and Effective Advertising, 189. Possession vs. Location; The University and Mining; Overcapitalization of American Mines in London, 190.

ELECTRICAL PROGRESS.—Kern River Electric Plant; Danger from Electric Current; A Growing Business; A New Electric Telegraph, 196.

SCIENTIFIC PROGRESS.—Conductivity of Metals at Low Temperatures; A Synthesis of Humanity; Microscopic Internal Flames Induces Fracture in Steel; Measuring the Velocity of Projectiles, 196.

MECHANICAL PROGRESS.—Use of Compressed Air in Foundries; Cantilever Bridges; How Mineral Wool Is Made; "Use of Tactorium in Europe," 197.

PRACTICAL INFORMATION.—Electing a President; Crude Turpentine; Prospecting for Minerals in the Province of Tse-Chuen; Money of the World; How Piling is Driven in Bavaria; Position Reversed; Cheese a Most Valuable Food, 197.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 198-9.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 210.

MISCELLANEOUS.—Concentrates, 191. Ocean Transit of Timber; Activity in Mining Enterprises, 192. The Free Coinage of Gold, 193. Vein Walls; The Accumulation of Amalgam on Copper Plates, 194. California Mines and Miners, 195. Coast Industrial Notes; Recent California Mining Incorporations; Obituary; Commercial Paragraphs; Recently Declared Mining Dividends; The Commercial Mines; Personal; Pateuts; Notices of Recent Patents, 202. Books Received; Power from Small Mountain Streams, 203.

Possession vs. Location.

Mention was made last week of the ruling of the Supreme Court of this State in the Altoona case to the effect that one may obtain full title to a claim by possession for five years without regard to formal location. The language of the decision was not as clear as it might have been, but the same thing has been well stated by Judge Beatty in the United States Circuit Court in his charge to the jury last January in the case of the Little Emily Mining and Milling Co. vs. William S. Couch et al., and as it is a matter of considerable importance we give a portion of his charge to the jury:

You will remember that the plaintiff does not rely absolutely upon a paper title, but rather upon a title by possession. Its location of the Eureka and Laura lode is evidenced by the original location notices. It has, that far, a claim of title. It claims under color of title, the claims having been located quite a number of years ago, and notices of location of those claims have been produced; but, generally, its title is based upon a title by possession.

I instruct you that a title by possession may be good in a mining case. It may become an absolute title. Congress, by section 2332 of the Revised Statutes, or by the act of, I believe, May 10, 1872, provides that a party may get a patent for a mining claim held simply by possession, providing that the possession has been of such a time as is provided by the statutes of the State. It gives a party title through possession.

In this State the statutes provide that one who has had a certain kind of possession of property—real estate—for the period of five years, has a title to the property, and the law of Congress applies to that. If one has the peaceable possession of a mining claim for a period of five years, that gives him the right to the title to that property, and the Government would issue him a title to that property—that is, a title in pursuance of section 2332.

Where there is a contest for a patent, even, they give title to the party who has held adverse possession for five years under a claim of title.

Judge Beatty in the same charge explained the position of alien locators of mining ground, claiming that only the Federal Government may raise this question on applications for patents. There are claims in this State which have been located a long time ago by aliens, and for which the owners would long since have asked for patents but for that objection. Their titles, however, are good except for that purpose. On this point, Judge Beatty said:

As a general rule, it is true that citizens only of the United States can locate mining claims, but it has been held by the Supreme Court, which is of course our guide, that that is a question that can be asserted or claimed only by the Government. In a contest between individuals, as in this case, which is an action of ejectment, that question does not arise; but when a party applies for a patent, the Government is interested, and in a case of that kind the citizenship of the parties must be shown before the party would be entitled to a patent; but this is not an action for a patent. It is an action of ejectment for the possession of that ground, and I instruct you in this case that that question cannot be considered. It is only for the Government to make that objection on the ground of non-citizenship.

Overcapitalization or American Mines in London.

The old habit of overcapitalization that has so often brought American mines into bad repute is growing up again in London. The trouble has seldom been that worthless mines were offered, but that good mines were placed for many times their real value. In the nature of things it is hard to place a mine on the London market at its real value. The greed of promoters and the customary high expenses of their art as practiced, and the large commissions or profits demanded by all concerned, all tend to place a fictitious value on good properties offered.

We have received from a correspondent a letter in which he says:

"I beg to enclose you the prospectus of a property offered in the London market which I would consider high priced at $150,000, but they ask £150,000 or $750,000. It is a batch of old mines situated in Montana, with an old 10-stamp mill and some 25,000 tons of ore in sight which they say will realize £32,000 when worked." The prospectus of the Gold Prize mines in Deerlodge county, Montana, goes on to relate that £130,000 is to go to the vendors and £20,000 is to be used as a working capital. Of this it is safe to say £6000 would be required to build a mill, leaving £14,000 for other expenses and a working capital. Any one acquainted with the method of expending large sums in administrating by English companies would understand that very little would be left to develop enough more ore than the £32,500 worth to pay back the capital it is proposed to invest. As usual, there is in the list of directors the customary man of title, the banker, and well-known mining engineer and the man who "is to join after the allotment."

But then the overcapitalization is not the only trouble. In these cases where investors show bad judgment in placing their money there is apt to be bad judgment in managing the properties. A number of years ago Ballard & Martin took hold of the New London mine in Amador county and expended over $300,000 in developing it. Hoisting works and a mill were erected and a shaft sunk, but while a large body of ore was opened up it was not found to be of high enough grade to pay to work. They pulled up their plant and went over to the Rawhide, giving the New London back to the former owner. Shortly afterwards a bond on it at $10,000 was secured from him by people who in turn handed it over to Harpending of "diamond swindle" fame for a trifling advance. Harpending had the mine placed on the London market with a capital of £200,000. The company began operations by having an expensive 40-stamp mill erected under a contract with a time penalty. Then they began the erection of hoisting works and finally started in to pump out the mine and look for ore. When down some 400 or 500 feet—not half as far as Ballard & Martin had sunk—they gave up the enterprise. The property, including the new mill, was sold for the benefit of a mortgage and bid in for Harpending for less than $5000. In this case whatever the Englishmen who lost by the venture may say of the manner in which they were taken in cannot certainly excuse themselves for their own wretched mis-management.

The *Engineering Magazine* for September says on this subject: "But the dissatisfaction which has too often attended the investment of British capital in enterprises in this country is something for which Americans are not always and altogether to blame. Faulty judgment in placing the money, and unwise operations following, have had their contributing influence, and for these our English cousins must accept the blame."

The University and Mining.

It seems a little singular, considering the millions of treasure, the vast range of industry opened to the people, the wonderful impulse given to agriculture, commerce and manufactures by mining, that, of all our great interests, it has had least recognition in every way from the national or State Governments. As the late J. Ross Browne said as far back as 1868: "If we take mining only in its past condition and its present transitive state, we must admit that it has caused most important general benefits, especially in anticipating by generations the peopling of the immense territories of the West, and thus widening the field for the display of national energies, broadening the spirit and firmly bracing the national credit. But for the mining furore of the last nineteen years, California would probably have remained a vast cattle range to this day, and all the great territories that adjoin it—now peopling with civilized communities and nearly traversed by a railroad uniting both shores of the continent—would still be savage wastes."

Probably the chief reason for the failure of the Government to give mining as much consideration as other industries is the fact that the miner—the "honest miner" of the West—is self-reliant by nature and seldom asks for help from others. This characteristic has given the tone to mining organizations. The California Miners' Association has, in fact, asked very little of the Federal and State Governments—less, indeed, than the magnitude of the industry they represent would warrant.

Take the State University, for example. Upon the College of Mines, in which there are enrolled more students than in any other scientific college in the institution, there is spent less money than on any of the others. The University is often spoken of as belonging to the people. Their desires should dictate, to a certain extent at least, what should be done there, and the fact that the College of Mines is more largely attended is evidence that mining education is wanted.

Although the college is doing good work, it is cramped for room, short of funds and has fewer instructors than it should have. This is true of other departments, but probably of none so much as this college. The fault lies largely in the fact that the mining industry is not represented in the Board of Regents, while other industries are.

If the California Miners' Association would ask the Governor to do so, it is hardly probable that he would refuse to appoint a representative of mining a member of the Board of Regents. That body is largely made up of lawyers and bankers, who manage the finances of the institution as well as those of any other public institution in the West. Aside from these men, the President of the State Agricultural Society represents one industry and the President of the Mechanics' Institute several others.

The whole mining world has of late years been looking to California for the best mining engineers. In the Rand and at Kimberley Californians have had charge of the largest enterprises; Californians have been called to Australia, to Siberia, to Spain, and all the way from Cariboo to Cape Horn California mining engineers are in charge of the greatest works. We have here in California the mines in which to train men for that profession. Geologists recognize the fact that there is no better field in the world for the study of that science than California. Everything tends to give the University of California an opportunity to build up the finest mining school in the world.

A regent in the university representing the mining industry could do much to enable the other gentlemen in the board to understand the value of the College of Mines and the needs of that department. The Governor need have no trouble in choosing a fit man for the position. There are in California mining engineers trained theoretically in the best mining schools in the world, and trained still better practically on the Comstock, and the more prominent mines of this State. Some of these men know mining, geology and mineralogy better than the average college professor, and know by experience what education can best fit young men for the profession. Where so good an opportunity exists to aid the great mining industry of this State it should be utilized.

Concentrates.

THE establishment of a mining exchange at Spokane, Wash., is being advocated.

A LARGE number of copper mining locations have been made lately in Del Norte county.

AT the Globe mine at Dedrick in Trinity County, Mr. Woodburn proposes to erect a 5-stamp mill.

IT is claimed that the mines of the Bingham district in Utah are able to put out 10,000 tons of ore per month.

THE Iron Mountain railroad in Shasta from Keswick to Iron Mountain has been opened for freight and passenger traffic.

ABOUT fifty carloads of freight are received at Colfax, Cal., each week for the mining towns of Grass Valley and Nevada City.

THE Gentle Annie quartz mine, near Placerville, El Dorado county, has been bonded by Melton and Parlow to T. D. Lane for two years.

NEGOTIATIONS are again reported pending in London for the sale of the Mercur mine of Utah, which is daily putting out 210 tons of ore.

ON Labor Day in Utah there is to be a great contest in ore drilling to be competed in by miners from Montana, Idaho, Nevada and Utah.

CHARLES M. GOODALL has bonded for one year the New York and New Year mines in Hunter's Valley, Mariposa county, from the owner, John Baretta.

IT is said that the Le Roi at Trail Creek, in British Columbia, is paying its owners $400 a day, the Slocan Star $1000 a day and the Silver King about $2000.

THE Potazuba Mining Co. has been organized at Sutter Creek by T. T. Lane, Senator Voorheis and others, to work the old Mechanics mine near that place.

FROM the enormous amount of printed matter sent out by both political parties it is evident that politicians, like all business men, recognize the value of advertising.

IN a rock-drilling contest at Helena lately, Joseph Freethy and John Davy of Butte came near the world's record of 41½ inches, drilling 40⅞ in hard blue granite in 15 minutes.

DURING the next two months there will be hauled to Dowds Landing, on the Utica Company's flume in Calaveras county, 600,000 feet of lumber for the construction of the flume westward.

ON a group of mines at Ragged Top in the Black Hills, Gen. Green B. Raum is operating a diamond drill claimed to be capable of sinking 2500 feet and bringing up a core 1¾ inches in diameter.

THE Crown Point, Hidden Treasure, White Swan and other claims at Rossland, B. C., have been sold for nearly $400,000 to a Toronto syndicate. This is the largest sale yet effected in the Trail Creek district.

THE Chicago and British company that is preparing to establish a 40-stamp mill and reduction plant on Cedros island, off the coast of Lower California, will probably use the cyanide process to extract the gold.

ON some picked ore from the S. Dewitt mine, in Cripple Creek, lately assays showed more than one-third to be gold. The certificates read 11,220 ounces, or $224,400 a ton, and is one of the highest returns ever given on fancy ore in that camp.

SEATTLE people are beginning to turn their attention to mining properties along the Straits of Georgia, between Vancouver Island and the mainland. While the ores are low grade, the cost of transportation would be light, and the bodies are large.

AT Green River, Wyoming, the Oil and Fuel Company is constructing a reservoir at a soda well which will be used to evaporate the product. It is expected to get 150,000 pounds of soda from one filling much of which will go to the cyanide works at Mercur, Utah.

IN digging a posthole for a hogpen near Angels Camp, Calaveras county, lately, Thomas Peachy discovered a 3-foot vein of pay ore. It is notable that many of the great mining discoveries, such as the Broken Hill of Australia and the Ontario of Utah, were made by accident.

ALTHOUGH a year ago Rossland, B. C., had but one developed mine, since then two mines in the camp have paid $275,000 in dividends. By October 1st there will be two railroads into the place, if the Columbia & Red Mountain is completed, as expected, by that time.

AN estimate of the amount of money produced at Tuscarora, Nevada, places the output of gold quartz at nine million dollars; placer diggings, six millions, making a total of fifteen million dollars. The Grand Prize, the richest mine, has produced about three million dollars.

GRAVEL MINING on large scales is being started up in Spain. A French syndicate has taken hold of the old mines in the Province of Leone, worked by the Romans at the beginning of the Christian era, and an English syndicate is exploiting some extensive deposits in the Province of Granada.

FIFTY-FIVE claims on the asphaltum beds on the Uncompahgre reservation have been filed for record in Utah. The claims embrace a strip from the Colorado State line near where it crosses White river, into the eastern border of Wasatch county, Utah, and wholly on the reservations.

AT the annual stockholders' meeting of the Marguerite Gold Mining and Milling Co., held in this city on the 25th ult. the following Board of Directors were elected: Wm. Schmitz, President; G. Gall, 1st Vice-President; F. M. Freund, 2nd Vice-President; H. Gimbel, Treasurer; Chas. Peach, Secretary.

JOHN FIELDING, in the Kootenay country in British Columbia, is an "honest miner." While surveying at the Ruth mine he discovered a fraction, which, if he had given a tip to some of his friends would have brought him probably $50,000. Instead of doing that he informed the owners of the Ruth, for whom he was doing the work, and they staked it.

COPPER mines are being developed on Texada Island, B. C. These mines are near the water's edge and the cost of shipping from the mine to smelters will not exceed $1 per ton—an important consideration. Recently two carloads of ore from the Apex mine in Money Creek, B. C., were shipped to smelters; the cost of packing to the railroad alone was $12 per ton.

THERE is a scheme to establish a plant at Salt Lake, Utah, for the manufacture of cyanide of potassium, now so largely used in the reduction of ores. The consumption of the article has increased largely all over the mining world and the increased demand has brought the price down. Another plant for the manufacture of cyanide is talked of at Niagara Falls.

THE Exploration Company of London has taken hold of a group of quartz mines in southern Oregon in what is termed Lucky Boy, in the Blue river mining district, near Eugene City. This is a new camp in which between forty and fifty locations have been made. George S. Baum, formerly at the Omaha mine at Nevada City, has been appointed superintendent.

IF the Argentaurum syndicate lately formed in New York should succeed in what it proposes to do before the election the silver question would be settled. The syndicate is building a laboratory to produce gold from silver and their savants can figure out as beautiful and convincing formulæ as ever came from the alchemists of the good old days before people became practical.

IT is reported that the Southern Pacific Company proposes to make Reno, Nevada, a terminal point—that is, charge no more on freight from the East to Reno than to Sacramento. This should do much good to the mines of that State, as well as to the agricultural interests. Heretofore it has been cheaper to bring freight to Sacramento and ship back to Reno than to ship direct to Reno.

GREAT forest fires have been raging in the Cœur d'Alene county, Stevens county, Washington, in the Metalline country and in the Kootenay, Slocan and other districts of British Columbia, and in many instances prospectors have been driven out by the smoke and heat. They are much worse than ever before because of the greater number of campers, prospectors and others ranging the mountains.

SOME of the gold coined by the United States has gone abroad and been melted down and recoined by foreign mints into their own money. Some is held abroad in a coined state. The Bank of Russia has $30,000,000 in American quarter eagles. Much gold coin which did not go abroad, but which lost some of its weight by wear and fell below the legal limit, has been recoined. The mint director estimates that there is about $600,000,000 of gold in the country.

AT Forty Mile creek in Alaska, the Canadian police levy a tax of $15 on each mining claim. In cases where there is a dispute as to whether the claim is on British territory the tax is not collected unless offered. If paid the owners are entitled to and receive police protection while those who do not pay are allowed to protect themselves. According to the *Mining Record* Forty Mile is very quiet, the diggings about worked out and the people are rapidly leaving the place.

THE second annual convention of the Northwest Mining Association will be held at Spokane, Oct. 6, 7 and 8, when it is expected that the districts of Montana, Idaho, Washington and British Columbia will be represented. Owing to its proximity to the great gold fields of British Columbia and the opening up of new mines in Washington, Spokane has become an important mining center, and the daily papers give more attention to that industry than anything else.

THERE has been a large increase in the number of mining students in the State University and at Stanford University this year, over eighty having entered the Colleges of Mines of these institutions at the last matriculative examinations. This not only indicates the increase in mining but an increased demand for men with proper training. Students have come to the two universities from many States outside of California, and this is an indication of the good reputations they are building up for thorough work. More than that, few of the graduates of the mining schools at Berkeley or Palo Alto are out of positions.

IT has been charged that the officers of the Palo Alto Company in British Columbia, which had received offers of 10 cents per share for a large quantity of treasury stock, from the sale of which working capital is obtained, have taken advantage of their position to swindle the company. It was the duty of the shareholders to obtain the best price possible for the treasury stock, in the interest of the company. Instead of doing this, it was moved and carried that the shareholders present take 50,000 shares at 5 cents a share—half the Toronto offer—thus enabling these shareholders to double their money by unloading at Toronto at the expense of the company.

AT Mercur it is denied that the Geyser is handling ores by the cyanide process at a gross expense of $1.77 per ton and that at both the Mercur and Marion the cost is less than $2 per ton. The Salt Lake *Tribune* says: "It is already known that by the roasting of the ores the percentage saved has been very materially increased. The only thing now is to reduce the cost of roasting that is already less than 50 cents a ton; indeed, much less in instances. Those who have worked most industriously upon the task know that nearly all the ores in the district contain an arsenical acid, and if it is made possible to roast all of them the result will be an important gain for the producer."

THE precious metals do not always supply the biggest mining stories for the papers. Tin will probably hold the record for a time now with the story telegraphed this week from Guanajuata, Mexico, of the discovery of deposits there with 100,000,000 tons of metal in sight, which at $400, which is about the usual market price, would be worth forty billions of dollars and at the present rate of consumption would last the whole world 1700 years. The telegram, however, is not so very definite and speaks of its assaying 6½ per cent pure tin. Even that is not bad. It would give 6,500,000 tons of pure tin worth $2,500,000,000 and would supply the world at the present rate of consumption 700 years. Truly, mescal is a marvelous drink.

ALONG the Rand in South Africa some fifty companies owning deep level mines—locations on the dip beyond the sidelines of outcrop locators—have sunk shafts the aggregate of whose depths so far is about 25,000 feet. Of these not more than one-fourth have reached the reef and the estimated additional aggregate depth to be sunk is 36,000 feet, and when this work shall have been accomplished the united depths of all the shafts will be about 62,000 feet or between eleven and twelve miles. There is great rivalry at times among the managers to make records for fast sinking. At the Robinson, at a depth of 1700 feet, 100 feet were sunk in a month by hand work. The best rock-drilling men are given high wages, some receiving from £60 to £70 per month.

THE fall in the price of lead is closing down a number of mines. The Ontario in Utah is closing: at Wardner, Idaho, it is reported that the leasers of the Stemwinder will store their ore for better prices. The Bunker Hill and Sullivan has laid off about 50 men owing to the low price of lead, but it is not thought that any more will be laid off unless the price of the metal further declines. The manager of the Red Cloud in Idaho, which has also stopped work, says that with lead at $2.50 per 100 pounds and silver at about 65 cents per ounce he can not pay expenses and will not try to do so. At the Last Chance mine at Wardner, owing to the fall in price of lead there was a cut of fifty cents per day in wages all around last week and 18 men quit, but their places have been filled. One of the largest smelters in Utah is closed and another announces that it will stop work as soon as the material on hand is worked up.

IN the Rand, South Africa, mining engineers are able to calculate the depth of reefs very closely up to 3060 feet from the outcrop, as is shown in the case of one of the shafts in the "Robinson Deep," which, a year ago, John Hays Hammond calculated would reach the reef at 1800 feet. The reef has lately been struck at a depth of 1806 feet. The average depth to which the main reef series has been stoped is not over 400 feet, and this shaft demonstrates the permanency of the reef to 2000 feet in vertical depth or nearly 4000 feet on the incline. It is estimated that £35,000,000 in gold has been taken from this series so far, and that the deep shaft sinking has demonstrated that there is available at least another £140,000,000. If the reefs continue to pay, it becomes a question to what depth with present known methods mining may be continued. It is claimed that 5000 feet vertical depth will not exceed the limit. This would give about 8500 feet on the incline.

THE associated mine owners of Leadville, failing to bring the striking miners to terms, last Monday decided to draw their fires and allow the mines to be flooded with water. In a few days they will be in such shape that it will take a year to clear them out again. The 10,000 miners and their families who have relied upon the mines of Leadville for their support must now seek employment in other fields. This great strike, which has lasted sixty days and ended disastrously for both sides, was caused by a demand on the part of the miners that affected a small part of those employed. The mine owners were willing to pay the rate that has always prevailed in Leadville, which was practically all that the union demanded, with the exception that the surface men were to receive $2.50 per day. It is possible that had the price of lead not become so low the mine owners might have been able to offer some concession to the miners, and it is probable that the late sudden fall in lead prices has had much to do with inducing the mine owners to take the steps they have.

GARDINER F. WILLIAMS, manager of the DeBeers diamond mines in Kimberley, South Africa, who is here on a visit to his relatives, says that the company of which he is manager owns five mines at Kimberley. One is down 1000 feet, another 1200 feet, and the third is being worked in the open; two are not being worked at all. The company employs 1400 white men and 6000 natives at the mines. "Last year we paid $8,000,000 in dividends," says Mr. Williams, "and this year we will pay the same amount. Cecil Rhodes, whom I have always found to be an excellent gentleman, is chairman of our company, and Barney Barnato is the life governor of the corporation. Arrangements have been made so that now we control the diamond market of the world. Some time ago a big syndicate was formed in England for the purpose of buying our diamonds. Members of this syndicate have their agents at Kimberley, and every week we make a cleanup and division of about 50,000 or 60,000 carats. In this way we find that we can keep the market of the world steady."

IN the next issue (Sept. 12) appears the closing installment of "California Mines and Miners," publication of which began in the issue of April 25. It has occasioned great interest all over the coast, and few things that the MINING AND SCIENTIFIC PRESS has published have elicited heartier praise. In the forthcoming biennial report of the State Mining Bureau a list of the mines and mining superintendents of California will appear of greater length and higher accuracy than the list which has been appearing in these columns for the past four months. The State can do those things better than private individuals, and State Mineralogist Crawford has been, as usual, accurate and painstaking in procuring correct data for such lists. This is said to dissipate a singular notion prevalent in some of the counties that the State Mining Bureau was in some way responsible for the errors and omissions that were unavoidably manifest in the list as published herein. Such was not the case. It was distinctly stated at the outset that the attempt was a pioneer one; that no accuracy or completeness was claimed, and that the idea was solely an approximate attempt to supply what was evidently required.

THERE is no industry that will build up a country as quickly as mining. In the Kootenay country, in British Columbia, the following machinery has been erected, nearly all within the past year: Slocan Star, 150-ton concentrator, 5-drill compressor and sawmill; Idaho and Alamo, 100-ton concentrator; Washington, 50-ton concentrator. In the Ainsworth district: The Number One, 50-ton concentrator; Canadian Pacific Mining and Milling Company, a 5-drill compressor and 50-ton concentrator; Kootenay Mining and Smelting Company, 100-ton smelter, 150-ton concentrator and 5-drill compressor. In the Nelson district: The Hall Mines Company, a 50-ton smelter and 50 tons additional ordered, 5 drill compressor; the Poorman, 10-stamp mill and 4-drill compressor. At Waneta the Kootenay Water Supply Company has three rotary pumps with a capacity of 5,000,000 gallons, and is about to install an electric plant to furnish power to the camps. At Trail A. Heinze has in operation a 200-ton smelter, to which additions are to be made. In the Rossland district: The O. K., a 10 and a 5-stamp mill and a 5-drill compressor plant; the Le Roi, a 40-drill compressor, a 10-drill compressor, 20, 50 and 250-horse power hoisting engines, 600-horse power battery of boilers, electric light plant, fire pumps, etc.; the War Eagle, a 20-drill compressor, 200-horse power boiler and two 50-horse power hoisting plants. Aside from all this, railroads have been projected, towns built and lighted with electricity and all the accompaniments of civilization brought in, and all within the short space of a year. Nothing but mining could accomplish these wonders.

Ocean Transit of Timber.

On the 27th ult. there arrived from the Columbia river, nearly 600 miles north of this port, a raft of logs—the second successful shipment of the kind. The first raft arrived here Aug. 1st, '95. The second was built at the same place by the same men, Bains & Robertson, Stella, Wash. The same tug, the Minneola, towed both rafts; the '95 raft was towed from bar to bar in 5¼ days; the '96 one in practically the same time. The '95 raft was 580 feet long, 52 feet wide; its girth amidships 139 feet; at the tapered sections 45 feet, being shaped like an immense cigar; it contained 5500 M feet, board measure, weighed 10,000 tons and cost here $37,000. The one that arrived last week was 528 feet long, 52 feet wide, 31 feet deep, contained 6000 M feet, board measure, and was built in just the same manner as its predecessor.

Bains & Robertson have had a varied experience. They built the same kind of rafts on the Atlantic side, and, after some disastrous losses, made a success of the project. The first one they built on this coast, in March, '94, was lost in a storm. The second and third have reached port successfully. They say now that they propose building a mill on the Alameda county shore, San Francisco bay, and manufacturing lumber here at a reduced cost of $3 per M feet; that, by bringing the logs down in rafts, they can furnish the lumber that much cheaper than when it is sawed on Puget Sound, British Columbia or the Columbia river and brought here by sail or steam.

Two views of the big raft are here given—one where the big cradle is being filled with logs and the raft about one-half built, at Stella, Wash., the other as it appeared in tow of tug, with river steamer to assist in rounding turns in the river, just previous to its emerging on the ocean en route to this port.

THE CRADLE BEING FILLED WITH LOGS.

Activity in Mining Enterprises.

Mining enterprises of the present day represent an enormous amount of invested capital. Probably, few, if any, other enterprises have the same claim on the public purse. Interest grows with every discovery of the precious metals. Signs of ore, no matter where found, in mountain or valley, in the sands of Africa or the snows of Alaska, no matter what the climate, risk or remoteness, are the signals for a stampede of men and money. Idle capital has a keen scent, and it can, as a rule, be depended upon to strike a bee line prompt and direct to the richly filled vaults of Mother Earth. It is easily captured by the shrewd and unprincipled promoter, who, angling in a shoal of golden fish, generally succeeds in landing the coveted price. History furnishes no end of examples of this kind. The greed for gain is now, and always was, more strongly marked in those who, in a financial sense, need it the least. Nor is it out of the usual experience of human nature that men with more audacity than principle, and with more shrewdness than conscience, are always in evidence when the opportunity of raking in the ducats is afforded them. In mining enterprises there was a time, and the clock has not run down yet, when the goose to be plucked and the man to bag its feathers were in abundance. It is, however, to be noted that a change for the better is showing itself. The ethics of mining are improving, and though rogues may be as many and fools as numerous, experience has not been without its remedial results. Mining is being lifted out of the gambling pit, speculation is less hasty and more strictly honest and reputable men are engaged in mining transactions than ever before. This, says the *Age of Steel*, is a healthful sign, and is doing more to place mining enterprises on a legitimate and permanent basis than any other means that could be devised. Of course there is always more or less of uncertainty in mining returns. This is inseparable from the situation. Till the subterranean vault is opened, there must be more or less guess work and speculation as to its contents. Science, however, is not so likely, as when less intelligent or experienced, to make any grave mistakes. It follows the trail of minerals, as a bushman does the spoor of a giraffe, or a hound the circle made by a stag or a hare. Its decisions are seldom guesses and the lay speculator has his risks minimized. The facilities for securing trustworthy information as to the standing and character of firms and corporations interested in mining developments, are largely increased, and men with a reasonable amount of caution and prudence can in nine cases out of ten "look before they leap." These facts considered, mining enterprises are less hazardous and the investor more secure. The elimination of abuses has been slow but continuous. Fraud is having a tightened bridle. Speculation is less a private vice or a public craze. Mining enterprises are less vagrant and spasmodic, and the class of men engaged in the business are of a better class than at one time dominant. With abundant resources of raw material, cleaner methods of business, and the more systematic building up of a great industry, the mining interests of the country have a broadening and a brighter prospect of stability, and a higher place in public confidence.

THE RAFT IN TOW OF TUG WITH RIVER STEAMER TO ASSIST IN ROUNDING TURNS IN RIVER.

Handsome and Effective Advertising.

(Continued from page 189.)

handsome book of 128 pages is filled with statistics of Colorado's mineral productions, description of different mining sections of the State and the process of extracting and reducing the ore, illustrations of different prominent mines and mining scenes with much local and general information, the whole being a splendid advertisement of the State. It is a pity, for a variety of reasons, that those who control the destinies of California railroads, and who are supposed to be interested in the progress of this State, cannot see the value of such publications.

Just as a "sample brick" the following from the heart of the publication cited is here given place. It is entitled

PLACER MINING ON A LARGE SCALE.

For ages the water from melting snows has percolated through the mother veins of gold in Gilpin and Clear Creek counties, and drop by drop loosened the little particles of metal from their snowy matrix, later gathering them together, as the waters reached the proportions of torrents, and deposited the gold in the bed of Clear creek. Flowing towards Golden, the water kept the quicksands in the bed of the river in constant motion, with the result of settling the heavier particles of gold on the bottom. Gradually the little yellow grains moved eastward, until a sudden projection of rock—a riffle, as the miners call it—stopped further progress. These riffles in time gathered quite a large pocket of metal, and for years the bed of the creek has been worked over and over by placer miners, who searched diligently for the little hordes of wealth stored by Nature beneath the flowing water. From Golden to Forks Creek, and sometimes up to the outskirts of Georgetown, the treasure hunters plied their occupation year after year. Flumes and riffle boxes sometimes a quarter of a mile long were erected, but seldom did there appear enough capital invested to make a very great showing. The men, generally, were satisfied to get fair wages, with the prospect of stumbling onto a riffle in the rock and cleaning up enough to keep them for a year or two.

AMERICAN PLACER, NEWLIN'S GULCH.

Last year there was a change. The uniform success of the workers, with primitive appliances, attracted the eyes of capital. A careful inspection of the river bottom was made, and at a point twenty-six miles from Denver it was discovered that the bottom of the creek was cut across by a wall of granite. A company was organized and operations began. A mile above an old stone dam was so changed that the water of the creek was diverted to one side of the bed. From this point a large flume was constructed to carry all the water for a mile and empty it again into the bed of the creek, below where the natural dyke was found. The object was to drain the whole creek, so that operations might be carried down to bedrock. An immense steel pipe was laid from a point far up the creek, to carry water for hydraulic mining, and a peculiar nozzle was sunk into the sand just above the dyke. When the water was turned on it came with terrific force and picked up great quantities of sand from the bedrock and conveyed the whole mass over a long flume, with riffles in the bottom, where the little particles of gold were caught and afterward recovered. For a time the elements rebelled against this robbery of Nature's treasures, and about as soon as the flume was in thorough working shape the great rain clouds towering above the dark cliffs suddenly parted, and a rush of water swept part of the works away. Again they were rebuilt, stronger than before, and once more did Nature protest. Then the persistency of man asserted itself, and a flume was built stronger than it was probable the waters would ever be, and for the remainder of the season the recovery of gold was successfully carried on.

The success of the first plant was responsible for another. Ex-Governor Prince of New Mexico and associates located on the creek thirty-five miles from Denver. Profiting by the experiences of the former company, they erected a flume a mile long, and along the side of the canyon walls. Their flume was not to drain the creek, however, but to carry water to a considerable elevation above their works, so that great pressure could be secured. They constructed a temporary dam around a small portion of the creek's bottom, and then started toward bedrock within the walls of this protection. The plant was completed too late in the season for any great work before the blasts of Boreas froze up the creek, but with the gentler zephyrs of spring, warmed by the smiles of Old Sol, will come activity around the plant, and the saving of gold will be begun in earnest. Undoubtedly other plants of a similar nature will be placed in during the coming summer, and as the bed of the creek is miles in extent, and each succeeding freshet only adds to the store of gold, there is plenty of room and lots of metal for all comers.

NEWHOUSE TUNNEL, IDAHO SPRINGS.

There is nothing technical or exact about the above. Were it published in the MINING AND SCIENTIFIC PRESS as an addition to the stock of knowledge on the subject, the only comment from miners would be an expression of surprise that this paper should devote so much space to a matter so thoroughly understood, when what was said conveyed no exact information; but it is meant for a class who have money to travel, and who are less interested in technical details than in the outlined indications of things to see and profitable investment therein.

INTERIOR OF MINERAL PALACE, PUEBLO, COL.

The Free Coinage of Gold.

The coinage of gold in the United States is free and unlimited; that is, any and every owner of gold bullion has the right to take it to the mint without limit as to quantity and receive in return therefor, and free of charge for mintage, full legal tender gold coin of the United States, weight for weight with the bullion deposited. The weight of standard gold in the dollar is 25.8 grains, and therefore the ounce of standard gold of 480 grains will coin into gold of the value of $18.604. So it is that the coining value or mint price of the ounce of standard gold of the United States Mint is 18.60\frac{4}{10}$. By standard gold is meant gold of the correct fineness for coinage which is in the United States nine parts pure gold and one part alloy. The British standard gold coin is 22 carats or $\frac{11}{12}$ fine. Hence, standard gold in America is 900 fine, while British standard gold is 916$\frac{2}{3}$ fine.

At the British mints the coinage value of an ounce of gold, 22 carats or $\frac{11}{12}$ fine, is £3 17s. 10½d. In both countries the mints are open to the free and unlimited coinage of gold, the mint authorities being obliged to accept gold on deposit for coinage, without limit as to quantity, and return to the depositor, without charge for mintage, the same weight of gold deposited, in the shape of legal tender gold coin. Thus, in America the owner of gold bullion can and does take it to the mint, and if he deposits gold bullion of standard fineness, that is, $\frac{9}{10}$ fine, and suitable for coinage without further refining, he will have returned to him, absolutely free of any charge for mintage, gold coin at the rate of 18.60\frac{4}{10}$ for every ounce deposited.

The practice in Great Britain is somewhat different. Although under the British mint laws any individual has the right to deposit gold at the mint for coinage, such privilege is not exercised. The reason for this is that the Bank of England is obliged to purchase all gold offered at the rate of £3 17s. 9d. per standard ounce, or at a discount of 1½d. per ounce from the coinage rate. That owners of gold bullion prefer to sell their gold to the Bank of England at this discount rather than deposit it at the mints for coinage is due to the fact that by so selling their bullion they can at once realize upon it, while, if deposited at the mint, they would have to await the delays of coinage for payment, thereby suffering loss of interest on the value of the bullion. This obligation of buying all gold offered does not rest onerously upon, but is rather a source of profit to, the bank, which, it is currently believed, is permitted to issue its notes against such bullion bought, just as it issues its notes against gold coin, so that the bank has full use of the gold during the process of coinage.

It has been a common practice among Governments to charge a seigniorage on coinage sufficient to offset the expenses of coinage, but since 1875 there has been no such charge in the United States. By seigniorage is meant the difference between the bullion and face value of coins. Under our mint system no charge for the coinage of either gold or silver was made prior to 1853, but the Mint act of that year, February 21st, provided that after July 1st, 1853, there should be a charge to the depositor of one-half of one per cent on the value of bullion, whether of gold or silver deposited. This charge amounted to $9\frac{3}{10}$c. on every ounce of standard gold deposited, so that the depositor of gold, instead of receiving as for some years prior thereto $18.604 for every ounce of gold deposited, received but 18.51\frac{1}{10}$. This charge was expected to defray the cost of mintage, and it remained unchanged until April 1st, 1873, when it was reduced to one-fifth of one per cent. Two years later, by act of January 14th, 1875, all charge was abrogated, and the coinage has remained free ever since.

But free coinage of gold does not mean that for every 23.22 grains of pure gold (the weight of gold in the dollar) deposited at the mint that the depositor shall receive free of all charge a standard gold dollar weighing 25.8; or, in other words, that for 100 ounces of pure gold deposited he shall have returned to him 111.11 ounces of standard gold coin. The cost of mintage is borne by the Government, but the cost of refining and alloy must be paid by the depositor. If the depositor deposits bullion of standard fineness, well and good. He will then have returned to him the equivalent of a gold dollar weighing 25.8 grains for every 25.8 grains of standard gold deposited and without any charge. But if the bullion deposited is crude, so that it must be refined and alloy added to make it of proper fineness, the depositor must pay the cost of refining and the alloy. So if 100 ounces of pure gold was deposited, the depositor would have to pay for the $11\frac{1}{100}$ ounces of copper used as alloy before receiving in return 111.11 ounces of standard gold coin. The cost of mintage is borne by the Government, but the cost of alloy, refining and preparing the bullion for coinage must be paid by the depositor.

Vein Walls.*

NUMBER III.

By T. A. RICKARD, State Geologist of Colorado.

(*Condensed.*)

In the Mammoth mine, Pinal county, Ariz., the granite in the east crosscut at the 300-foot level, north, has an extraordinary number of fissures partially occupied by broken pieces of rock, so wedged in as to leave open spaces. The pieces are not of any foreign rock, but are identical with the enclosing granite.

This instance suggests why mining excavations collapse, and yet a natural cavity underground might remain open. The former contains unconfined air only, while the latter may be filled with a confined and practically incompressible fluid, water.

It is the usual experience in mining that when the abandoned workings of a mine are flooded they are less likely to collapse than when they are dry. This is partly due to the exclusion of air, and partly to the sustaining power of water itself, as suggested by Mr. P. Argall.

The formation of the hollow spaces occasionally seen in veins is, I believe, in most cases subsequent to the ore deposition, and may therefore have taken place at a time when erosion had brought that portion of the vein near to the surface. The Indiana section shows that the cavities have been produced by the shattering of a vein of zinc-blende already formed. The only occurrence of later date is the consolidation of the mass by the agency of water bearing silica, unaccompanied, so far as can be seen, by the deposition of any metallic minerals. In the Mammoth mine the blocks of rock wedged within the cavities were coated with crystals of vanadanite and wulfenite; but there seems to be no connection between the presence of these later minerals and the formation of the ore-bearing parts of the lode. They are the result of secondary processes, of which the upper part of a lode is the characteristic zone of activity.

Incidentally, I would say that I know of no mining district which illustrates modern views on ore deposition so clearly as does Cripple Creek. Of such mines I would quote the Independence vein, whose richness is such as to cause its commercial value to obscure its scientific interest. It does illustrate very aptly, however, this part of our inquiry, because the ore is so very evidently only altered country rock. In 1893, when the workings had not penetrated far from the surface, the carloads of ore sent from this mine to the Denver smelters gave the impression that some one had blundered, and either shipped waste from a crosscut or else switched cars of ballast into the place of loads of ore. One could see that it was the normal Pike's Peak granite with its big pink feldspar, but it required a trained eye to note that the mica had been largely removed, leaving small iron-stained patches. It was ore by courtesy, because there was enough gold present to give it a certain commercial value; but to the petrographer it was clearly granite, not much altered and but slightly mineralized.

The vein leaves the granite and, going northward, penetrates into andesite breccia. Its character remains the same; the ore is still altered country rock, only now it exactly reproduces the structure of its new encasement, and the habit of the andesite breccia is quite evident, although blotches of sylvanite and fluorite may occasionally try to obscure it. The strike of the vein, its width, its richness, all appear unaffected by the passage from one formation into the other, while the change in the structure of the ore is so marked as to render it easy for the observer to know what is in the enclosing rock without looking at the walls.

In a case such as this—and it is not abnormal—it is not necessary to suppose the original existence of an open cavernous fissure since the material of the vein is the material of the rock which was there before vein formation began. The vein follows a line which became a path for metal-bearing waters. Minute interspaces there probably existed, such as would be produced by the crushing and slight dislocation of particles of rock lying along a line of fracture; but a clear opening, a crevassing, such as accompanied the origination of the dyke, seems hardly needed.

Occasionally, it is true, we do find veins full of minerals foreign to the encasing rock, and so symmetrically arranged in bands having a comb structure as to suggest to many investigators that they were formed by successive crystalline growth from the walls of a vacant fissure. The reversed repetition of the quartz, rhodochrosite and sulphides is evident enough; but the most striking feature to me is the equal width of the two bands of the same mineral. Each vein of mineral would seem to have been fractured exactly in the middle previous to the deposition of the next succeeding one.

*Trans Am. Inst. M. E.

(*To be Continued.*)

The Accumulation of Amalgam on Copper Plates.*

NUMBER III.

Communications in discussion of the paper of MR. R. T. BAYLISS, presented at the Pittsburg meeting, February, 1896.

Robert Gilman Brown and R. C. Turner, Bodie, Cal.: The facts of particular interest in Mr. Bayliss' paper are the value of the absorbed amalgam and the changed ratio of silver to gold in the adhering amalgam, as compared with that of the routine clean-ups.

A single statement on the first point deserves special consideration, namely, that "upon being cut up and melted into a bar, the value of the gold and copper contents amounts to more than twice the value of a new plate; hence the subsitution of new plates for old is an expenditure which can be viewed without concern."

This conclusion is not of necessity ture; and whether it be true or not depends upon a question to which the conditions of the case give no answer.

Does the absorption of amalgam into a new plate proceed promply, being chiefly accomplished within, say the first thirty days of use, or is it a direct function of the time, increasing in simple proportion?

On the face of the matter the former seems the most probable, as the appetite of the plate for the amalgam should become weakened with its partial satisfaction. On the other hand, it is possible that the soaking of the amalgam into the plate may proceed so slowly as to make the monthly rate appear practically constant for several months, or even years.

To obtain a little light on this point, three strips of silvered copper, approximately 1x3 inches in size, were placed on the battery apron of the Standard Company's gold mill at Bodie, California, which is operated without battery amalgamation. There they were left for varying periods and subjected to the same routine of cleaning and scraping with the aprons themselves. They were finally cleaned as closely as possible, all surface amalgam being removed, and their values were determined. The complete results appear in the following table:

These leave much to be wished for in the way of more complete information, but also serve to strengthen the *a priori* probability of the alternative first stated above.

Studying the absorption of gold only, the rate per day per square inch of surface for the several strips is as follows:

No. 1—3.68 milligrammes.
No. 2—1.14 milligrammes.
No. 3—0.68 milligrammes.

Or for No. 2, assuming its unit increase for the first two days to be the same as that of No. 1, the increase for the remaining five days is 0.60 milligrammes, or 0.12 milligrammes per square inch per day. And for No. 3, assuming its increase for the first seven days to be the same as for No. 2, for the remaining seven days it is 1.51 milligrammes, or 0.22 milligrammes per square inch per day. This result, though not quite at one with that from No. 2, still marks strongly the tendency in the case.

From this it would appear that the destruction of plates for the sake of the absorbed amalgam may be poor economy. For if, as appears probable from this experiment, the greatest absorption takes place in the first few days of the run, the larger part of the value recovered by destruction of the plate is immediately taken up again from the daily amalgam, and at the same time the mill is taxed for a new plate.

But, in any event, it would appear that the recovery of absorbed values by destruction of the plate is of the nature of a discounted loan, in which the discount amounts to the value of the new plate, and the repayment of which must be provided for by monthly deductions from product, to the amount of which the loss of interest on these deductions must be added. With more complete data as to the rate of absorption this could be expressed as a formula; but the constants would certainly vary with different ores and changed conditions of plates.

(*To be Continued.*)

*Trans. Am. Inst. M. E., February, '96, meeting.

TESTS OF ABSORPTION OF GOLD AND SILVER BY COPPER PLATES IN THE STANDARD CONSOLIDATED MILL, BODIE, CALIFORNIA.

NUMBER OF STRIP.	Weight in Grammes	Area in Square Inches	Milligrammes of Silver on Strip, Calculated from Area	Number of Days Strip was Exposed	Number of Milligrammes of Gold and Silver on Strips After Use.		Number of Milligrammes Gain in Silver by Use, Calculated by Areas.	Number of Milligrammes of Gold and Silver Absorbed per Gramme of Copper.		Number of Milligrammes of Gold Absorbed per Square Inch of Top Surface	Number of Milligrammes of Silver Absorbed per Square Inch of Top Surface	Ratio of Gold to Silver
					Gold.	Silver.		Gold.	Silver.			
1	6.56	3.00	2.652	2	22.12	5.68	3.028	3.37	0.40	7.37	1.01	100:14
2	6.67	3.02	2.670	7	24.10	5.22	2.55	3.61	0.38	7.98	0 84	100:10
3	6.94	3.10	2.740	14	29.40	6.94	4.20	4.24	0.54	9.48	1.35	100:14
Sample assayed	0.8228	.43	0.380							Fineness.		
Sluice plate	0.687	....	.....							Gold.	Silver.	
Sluice-plate amalgam										108.77	84.39	100:77
Sluice plate										3.64	0.61	100:17

—OFFICE OF—

VICTOR AMALGAMATOR CO.,

703 South Main Street.

Los Angeles, Cal., August 18th, *1896.*

Curtis-Harrison Advertising Co.,
Southern Cal. Agents Mining and Scientific Press,
349 Wilcox Building, Los Angeles, Cal.

Gentlemen:-

Your suggestion that we use the Mining and Scientific Press for advertising our Victor Amalgamator has proven a good one.

We have received more inquiries and much better results from our small advertisement we placed some time ago in that journal through your agency than we have from all other advertising we have ever done.

Besides Eastern, Northern, and local points, we have heard favorably from Old Mexico, New Mexico, Arizona, Colorado, Nevada, and British Columbia.

We have found this space very valuable and are well pleased with the service of the Mining and Scientific Press.

Yours very truly,
Victor Amalgamator Co.

By J. A. Hedge M'g'r.

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

TUOLUMNE COUNTY—Continued.

Name of Mine.	Character of Mine.	No. of Men Employed.	Location	Name of Superintendent or Agent.	Address.
Dead Horse Mine	Gold quartz.	31	9 m SE of Sonora	Cap C. H. Thomas, Sup	Carters
Dorsey Mine	"		Sonora	Mrs. Dorsey, Owner	Sonora
East Lode Mine	"	2	¼ m W of Tuttletown	Patrick Mullins, Own	Tuttletown
Erin go-Braugh Mine	"		Stent	Edgar Fischer, Own.; E. A. Stent, Agt.	Stent
Eureka	"		8 m SE of Sonora	Capt. Thomas, Supt.	Carters
Eureka Consolidated	"		Carters	C. H. Thomas, Supt	Carters
Easterbrook	"		7 m N of Soulsbyville	Wm. Floyd et al, Own	Soulsbyville
Eureka	"		½ m S of Sonora	J. K. Faxon, Own.	Sonora
Evans	"		7 m N of Soulsbyville	Wm. Sharwood, Own	Soulsbyville
Excelsior	"		2½ m NE of Confidence	Fred Sutton, Own	Sonora
Eagle	"	11	2 m NW of Jacksonville	A. Halsey, Supt.	Jacksonville
Elgin	"		6 m NE of Groveland	Henry Argall, Own.	Groveland
Eunice	"		8 m NE of Groveland	Henry Argall, Own.	Groveland
Eureka	"		Sonora	J. F. Maxon, Own.	Sonora
Fischer Mine	"		½ m W of Tuttletown	J. A. Fischer, Own.	Sonora
Florence Mine	"	2	1 m SE of Tuttletown	H. Orlando, Own	Tuttletown
Ford Mine	"	2	1 m NE of Sonora	— Ford, Own	Sonora
Fairview Mine	"	2	Sonora	Conrad & Colby, Own	Sonora
Fanzy Mine	"	3	Sonora	Cunes & Oneto, Own.	Sonora
Grizzly Mint	"		½ m SE of Summerville	Leachman & Sharwood, Own.	Soulsbyville
Golden Rule	"	27	¼ m S of Stent	E. E. Stent, Supt.	Stent
Gold Hunter	"		11 m SE of Sonora	P. J. Sullivan, Own	S. F.
Good Hope	"		6 m N of Gibsonville	A. H. Schnabel, Supt	Gibsonville
Gray Eagle	"		Quartz Mountain	W. E. Holmes, Supt.	Stent
Garfield	"		12 m SE of Sonora	M. B. Harriman, Supt	Sonora
Garrett	"	5	½ m NE of Sonora	Garrett Bros., Own.	Sonora
Georgia	"		½ m SW of Carters	Col. J. N. Coles, Supt	Carters
Good Shepherd	"	3	3 m N of Soulsbyville	W. H. Barron, Own.	Soulsbyville
Gladstone	"		1 m E of Jackson	Thos. W. Lutts, Own.	Sonora
Gloster	"	1	2 m SE of Carters	Jas G. Gloster, Own	Carters
Golden Gate	Gold.	20	1 m S of Sonora	— Smitherson, Supt.	Sonora
Gamble	"		1 m S of Groveland	WinslowHubbard, O'n	Groveland
Garfield Virginia	"	4	17½ m E of Sonora	J. N. Purdy, Own.	Sonora
Gladdis	"		6 m NE of Groveland	H. Argall, Own.	Groveland
Godfrey	"	5	4 m N of Groveland	T. G. McGuire, Supt.	Groveland
Gold Nugget	"		See Merritt	E. D. Burdick, Own.	Groveland
Gold Bug	"	1	1½ m NW of Big Oak Flat	R. F. Lorensen, Own.	Big Oak Flat
Golden Eagle	"		2 m W of Groveland	Lee Wash and Sampee, Own	Big Oak Flat
Golden Rock	"	1	2 m W of Groveland	H. A. Conrad, Own.	Groveland
Golden Star	"		2 m W of Groveland	Stanley, James and Reid, Own.	Big Oak Flat
Giant	"	2	5 m SE of Jacksonville	J. J. Hughes, Supt.	Chinese Camp
Grizzly Eureka	"	1	½ m N of Priests Hotel	Harper Bros., Own.	Big Oak Flat
Hancock	"		2½ m W of Tuttletown	Pablo Rodriguez, O'n	Tuttletown
Hitchcock	"		Quartz Mountain	John Ballard, Supt.	Quartz Mountain
Halloway	"	10	8 m NE of Gibsonville	Spencer & Gould, Own	Gibsonville
Hamilfield	"	21	7 m NE of Columbia	Saml Trewarther, Sup	Columbia
Hazel Dell	Gold quartz.		7 m N of Soulsbyville	Wm Sharwood, Own	Soulsbyville
Henrietta	"		4 m NE of Carters	C. F. Haslam, Own	Carters
Hibbling	"		1 m N of Soulsbyville	Hibbing Bros., Own.	Soulsbyville
Hope Mine	"	2	¼ m NE of Sonora	Ralston & Arillo, Own	Sonora
Hyde Mine	"		6 m NE of Sonora	Belleview Mining & Ag. Co., Own.	S. F.
Hayes Mine	"		Near Jacksonville	Thos. Hayes, Own.	Jacksonville
Hector Mine	"		3 m NW of Jacksonville	J. L. Whitney, Own.	Quartz Mountain
Hidden Treasure	"		1½ m SW of Priests	Rhodes & Flack, Own	Stockton
Hoffman (Ready)	"		7½ m N of Groveland	Unknown.	
Homestake	"	3	1½ m NW of Jacksonville	Unknown	
Independence	"		¼ m NE of Tuttletown	W. E. Nevills & John Penrose, Own.	Tuttletown
Independence	"		10 m NE of Sonora	Baker & Hamilton, O'n	S. F.
Isabella & Gem	"		¼ m N of Rawhide	J. F. Faxon, Own	Sonora
Jumper	"	25	½ m S of Stent	E. A. Stent et al, Own	Stent
Jumbo	"		1 m W of Soulsbyville	Jas. Burns, Own	
James	"		1 m NW of Groveland	James Bros., Own	Groveland
Karrington Mine	"	4	¼ m NW of Tuttletown	Jas. Gillis, Own	Tuttletown
King Solomon	"	2	¾ m W of Tuttletown	A. O. Vistrong, Own	Tuttletown
Knox & Boyle (Sta. Isabel)	"		Quartz Mountain	W. S. Holmes, Supt.	Stent
Kaiser Lead	"	3	½ m NE of Sonora	F. W. Buckwalter et al, Own. (Leased to Jno. Mandick.)	Sonora
Keltz	"	26	10 m NE of Sonora	Wm. Sharwood, Supt.	Soulsbyville
Kephart	"		2½ m SW of Carters	Saml Kephart, Own.	Carters
Kanaka	"	5	5 m E of Groveland	Louis Casseretts, O'n	Groveland
Kriss Cross	"		1 m N of Priests	J. J. Hughes et al, O'n	Chinese Camp
Lucky Star	"		1½ m W of Rawhide	J. L. Ross et al, Own.	Redwood
Lookout	"		1½ m W of Rawhide	Miss M. Townsend, O'n	Sonora
Lead Mine	"	3	½ m W of Tuttletown	W. B. Clement, Own.	Tuttletown
Laura & North Star	"		¼ m N of Summerville	J. Oliver, Supt	Sonora
Lost Channel	"	3	2 m E of Cromberg	J. Nevills & Langport Bros.	Johnsville, Plumas Co.
Live Oak	"		1 m S of Soulsbyville	Black Oak M. Co., Own	Soulsbyville
Little Josie	"		10 m NE of Sonora	Baker & Hamilton, O'n	S. F.
Little Gem	Gold.	3	1 m W of Jamestown	Hensley Bros.	Jamestown
Lamphyre	"		10 m NE of Sonora	R. Chutte, Own.	105 Front St, S. F.
Last Chance	"	3	3 m S of Sonora (Kincat Flat).	Bendel D Channey, Sup	Wetmore
Lady Washington	"	4	¼ m SE of Summerville	Wm. Hunter, Own.	Sonora
Lena Belle	"		1 m SW of Carters	Bondel & Stent, Supts	Stent
Live Oak	"		½ m W of Soulsbyville	Col. J. T. Cole, Supt.	Carters
Louisiana	"	8	1 m NW of Carters	Scott, Dowe & Co., Own	Sonora
Last Chance	"	2	Sonora	Marg McCormick, Own	Sonora
Longfellow (Butler)	"		3 m W of Groveland	Bonded to L. W. Howe	Carters
Lumsen	"		½ m S of Priests	Conrad & Colby	Sonora
Little Wonder	"	3	2 m NW of Big Oak Flat	D. F. Longfellow, Own	Big Oak Flat
Mother Lode	"		¾ m W of Tuttletown	D. Lumsen & Son, Own	Big Oak Flat
Midas	"		1½ m W of Tuttletown	David Hart, Lessee	Big Oak Flat
Means & Wilson	"	12	1¼ m NW of Tuttletown	Patrick Mullins, Own	Tuttletown
Mascot	"		1¼ m NW of Tuttletown	Mrs. Rickert, Own	Rawhide
Marryatt	"		Tuttletown	Jas. Gillis, Own	Tuttletown
Miller & Holmes Mine	"		Quartz Mountain	W. E. Holms, Supt.	Stent
Mazeppa	"		1 m S of Stent	Wm. Harris, Own	Jamestown
Mayflower	"	4	6 m S of Quincy	Webb & Edwards, Own	Quincy
Mooney	"		1 m N of Quartz Mountain	A. Hayward & Co., Own	S. F.
Monitor	"		3 m NW of Confidence	Jno. Neale et al, Own	Sonora
Mt. Stanislaus	"		½ m S of Robinson's Ferry	McArdle Bros., Own.	Robinson's Ferry
May & Hunter	"	2	½ m NE of Sonora	Chas. Lang, Own.	Sonora
Mayflower	"	2	1 m SW of Carters	Col J. L. Cole, Supt.	Carters
Mt. Vernon	"		2½ m NE of Confidence	Fred Sutton et al, Own	Sonora
Mack	"	5	2 m W of Groveland	Albt Mack et al, Own	Big Oak Flat
Mammoth	"	38	½ m N of Jacksonville	J. F. Bluett, Supt	Jacksonville
Mary Ellen	"		5 m N of Groveland	Unknown.	
Martha Washington	"		5 m W of Chinese Camp	Martha W. G. M. Co, O'n	Oakland
Merritt & Gold Nugget	"	4	2 m S of Groveland	E. B. Burdick, Own.	Groveland
Mexican	"	2	6 m NE of Groveland	Jos. Urquhardt, Own.	Groveland
Miranda	"		6 m NE of Groveland	H. Argall, Own.	Groveland
Mississippi	"		2 m W of Groveland	John McLaughtin, O'n	Coulterville
Mormon	"		2 m W of Groveland	T. Marconi et al, Own	Big Oak Flat
Mount Jefferson	"		Groveland	J. H. Brown, Own.	Boston, Mass.
Mount Zion	"		1 m E of Groveland	Louis Casserette, O'n	Groveland
McFarnahan	"	2	2½ m W of Sonora	F. McFarnahan, Own	Sonora
McCann	"		½ m W of Jamestown	A. Hayward & Co., Own	S. F.
McCove	"		6 m NE of Groveland	H. Argall, Own.	Groveland
McAlpine	"		4 m NW of Coulterville	Est. of P. Mynant, O'n	Oakland
Neubaumer	"		1 m N of Tuttletown	— Neubaumer, Own.	Tuttletown
North Fork Mine	"		1¼ m E of Summerville	Thos. Soulsby, Own.	Soulsbyville
New Era Mine	"		½ m S of Stent	Durgan & Fitzgerald Bros., Own.	Jamestown
Nyman Mine	"		Quartz Mountain	Santa Isabel M. Co., Own; W. E. Holms, Agt	Stent
Neversweat	"	2	1 m N of Columbia	Peterson & Keefe, Own	Columbia
Neale Mine	"	4	½ m E of Sonora	Mrs. J. H. Neale, Own	Sonora
New Albany	"		9 m NE of Sonora	Ballard & Martin, Own	S. F.

*Begun in issue of April 25, '96. (To Be Continued.)

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MINING AND SCIENTIFIC PRESS

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IF you want your business announcement seen only by *YOURSELF AND YOUR COMPETITORS IN BUSINESS* put it in some one of the numerous catch-penny advertising schemes daily proffered you, without circulation, standing or influence.

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A paper that has led in its line for thirty-six years must have the qualifications that entitle it to the patronage of intelligent men who realize that, while advertising pays, money is thrown away that is given for advertising in papers with no circulation and which give no results

It is not what advertising costs, but what it produces that determines its value.

The MINING AND SCIENTIFIC PRESS produces satisfactory results to those who use it. : : : : : :

Economy is the judicious expenditure of money. It is sometimes economy to save ten cents; it is sometimes economy to spend a thousand dollars. Economy in advertising means to put your advertisement where it will do you good.

Success or failure depends upon profitable advertising. Our patrons find an investment in our columns a profitable one.

J. F. HALLORAN, Gen'l Manager,

12 FRONT ST., SAN FRANCISCO, CAL.

Electrical Progress.

Kern River Electric Plant.

The power of the Kern river, the third largest stream in California, is now about to be utilized, the work undertaken by the Power Development Company being nearly completed. The contract for the electrical equipment has been awarded to the General Electric Company, whose three-phase apparatus will be used to transmit the power of the river to Bakersfield, fourteen miles.

The point selected for the power house is at the mouth of the canyon on the north side of the Kern river, almost sixteen miles northeast of Bakersfield by wagon road. Here the stream, after a boisterous course of one hundred miles from the slopes of Mt. Whitney, through a series of rugred, precipitous canyons, forms a number of cataracts and rapids previous to taking a placid course through the cultivated valley lands. The point of diversion of the necessary flow for the power is some 9000 feet up the canyon. Some idea of the difficulties to be overcome in this work may be gained from the fact that to secure a bed for the flume a roadway was cut from the solid rock along the sides of the canyon. All the timber was hauled by team a distance of sixteen miles to the south side of the river. A bridge was thrown across the tramway 325 feet long, with a grade of 30 per cent, laid up the steep hill to the point where the flume was to end. A steam sawmill was then set up at the foot of this tramway, the timber cut to proper dimensions, loaded on the cars and hauled up the grade.

The flume was begun at the power house end. This flume is 8 feet wide and 6 feet deep and is covered. A railroad track is laid upon the cover for the full length of the flume, 8000 feet. There are no sharp angles, the changes in the course being made by curves and tangents. The grade is 5.8 feet to the mile, and 475,000 feet of redwood is used in the construction of the flume, which at one point is carried on an arch, with a 60-foot span, over a bad place on the cliff. The flow is calculated at 280 cubic feet per second. At its terminus at the mouth of the canyon, 8574.9 feet from the point where it leaves the river, it is 202 feet above the power house. Here the water enters a steel pipe 540 feet long and 5 feet 6 inches in diameter. The fall from the end of the flume to the power house is 201.9 feet, and the capacity of the water is estimated at 7500 H. P.

The electrical equipment will consist at first of two 450-kilowatt General Electric three-phase generators, running at 257 revolutions per minute. The voltage at the dynamo terminals will be 550. This will be raised in step-up transformers to 11,000 volts, and will be carried on six No. 4 bare copper wires to the sub-station at Bakersfield, where it will be transformed down to 2000 volts for distribution.

The current will be utilized at first to operate an extensive system of electric railroads connecting Bakersfield with Kern and other districts. It will also be applied at once to street and house lighting, as well as to the operation of pumps for irrigation purposes. The mines in the mountains to the east will also probably take current for their mills, hoists, pumps, etc.

The president of the company is Chas. Webb Howard. W. F. Goad is vice-president and C. N. Beal secretary and treasurer. The work is being pushed to completion as rapidly as possible, and it is expected that by November 1st the current will be turned into the transmission wires.

Danger From Electric Current.

Nikola Tesla says every metallic paint is a conductor of electricity, and it is only one of the many dangers to which persons unaccustomed to dealing with that fluid are subject. "You cannot call it a new danger, as it has existed, of course, ever since electricity was first put to practical use. It is, however, a new instance of the fatal result of carelessness in dealing with it." The great minds in the sphere of electricity are constantly seeking to minimize the danger of high voltage in cities. They are striving to render it as harmless as it was in the hands of the Greeks, for therein lies a discovery that will be as great a boon to mankind as its benefits.

Any one is infinitely more safe in an iron building amidst scores of wires than in a brick or wooden building, because the very proximity of so many wires would tend to draw the electric current one from another, and the iron would draw it from all, thus minimizing the danger to any person in a building where electric wires are in use. Death might, of course, be found in a gilt picture frame, providing the current was strong enough and the conditions permitted a ground connection. It would be perfectly safe to touch any object that might be charged with electricity provided the feet did not touch the floor, or that the latter was of dry wood, carpeted or covered with some other non-conductor. But if the floor should be of iron or other metallic substance, or of wet wood, the necessary ground connection would be there, and the current would pass through the body.

A Growing Business.

The growth in the use of electricity is none the less rapid because carried on quietly. To gauge the progress, attention should not so much be directed to the fields of electric lighting and electric railways as to that of electric power, a field which is now steadily repaying the arduous culture bestowed upon it during the past few years. Not a day now passes without the record of some extensive project for the transmission of power, or of the completion of some installation in which the current is used either to supersede steam, or in new places where steam would otherwise have been selected. Mills, mines, factories, shops of all kinds all over the country are steadily coming to the use of electric power, and the first failure has yet to be recorded. The economy and efficiency of electric power is perhaps most forcibly demonstrated by the extent of the orders placed for power apparatus, for it may be confidently asserted that greater engineering talent and closer examination is brought to bear upon electric power apparatus than upon apparatus of any other order. We have secured from the General Electric Company's power and mining department some figures which illustrate not only the growth in the use of electric power, but also its economy and efficiency. These figures are represented in the unfluctuating H. P. instead of in dollars, which, on account of the fluctuation in prices, offers no standard gauge—the figures taking cognizance of electric power apparatus only:

	1892.	*1893.*	*1894.*	*1895.*
Horse Power.....	13,719	18,762	42,379	46,727

In 1896 the missionary work of the past four years began to come to rapid fruition. From January 1st to July 1st the total H. P. of the apparatus ammounted to over 48,000. During the same period in 1895 the aggregate orders amounted to 25,737 H. P. From August 1st to August 18th the total amount of power apparatus ordered during 1896 was increased to the respectable figure of 62,164 H. P. Such a showing in face of the universal dullness in business everywhere is remarkable.

THE United States Consul at Copenhagen, Robert Kirk, has forwarded to the Department of State at Washington a description of a new electric telegraph. The apparatus was constructed by a young boatswain in the Danish navy, and makes it possible to communicate with a ship at a certain anchor ground without any direct line from land. An electric battery is placed on the shore with one pole in contact with water or moist earth, while the current from the other pole, through a telegraph key and a revolution interrupter, is conducted to a cable, which is laid out to the anchor ground and placed around the latter in a coil with a diameter of 1000–1200 feet. On board the ship, which is situated at the anchor ground or a short distance outside the coil, there is a small solenoid with which a telephone is connected. When a message is sent from the land a bell sounds on the ship, and the communication is sent by the telegraph key through the telephone instrument. The signals may be based on the Morse alphabet. The apparatus may also be so constructed that an answer can be sent from the ship. The inventor thinks he will succeed in making it possible to speak through the instrument, as in the case of the common telephone. Vessels at sea, it is said, will be able to telegraph to each other when each has a solenoid on board. The distance at which they will be able to do so will depend on the length of wire and strength of the electric batteries.

Scientific Progress.

Conductivity of Metals at Low Temperatures.

Prof. J. A. Fleming, F. R. S., has given an account of some researches made in conjunction with Prof. Dewar in the laboratories of the Royal Institution into the magnetic and electric properties of metals at low temperatures. These showed that the conductivity of a pure iron wire, at ordinary temperatures only about one-sixth of that possessed by a copper wire of equal size, was increased nine or ten times under the influence of the cold of liquid air. But while pure metals had their conductivity immensely increased by intense cold, it was shown that alloys, such as brass or German silver, experienced in the same circumstances a comparatively small increase in conducting power—not more than about 10 per cent. By carefully examining with a suitable form of resistance coil the variations in the electrical resistance of a large number of chemically pure metals cooled to about 190°, Profs. Dewar and Fleming have established that every pure metal would in all probability have no electrical resistance at the zero of absolute temperature; or, in other words, would become a perfect conductor of electricity. In this condition the passage of an electric current would generate no heat in it. Another consequence would be that a pure metal at the absolute zero would form an absolutely opaque screen to electro-magnetic radiation. These experiments furnished an additional proof that the process by which an electric current was conveyed from place to place was primarily dependent on actions going on outside. At the absolute zero any electric power, however large, could be transmitted along metallic wires; however small, without loss of energy. Of mercury, at its freezing point, the conductivity rose fourfold, and beyond that point increased in such a way as to show that at the absolute zero its conductivity would be perfect. The peculiar differences in the resistance of pure and slightly impure bismuth were described and proof was adduced that the result of taking the electric resistance of a wire of any metal in liquid air afforded a conclusive test of its chemical purity. It was found that the remarkable property possessed by bismuth of undergoing a great increase in electrical resistance when placed in a magnetic field was increased several hundred per cent by the cold of liquid air. In contrast with metals, carbon and non-metallic bodies increased in electric resistance as their temperature was reduced, this increase continuing to take place as far as the lowest temperature reached. In conclusion, Prof. Fleming laid stress on the value of the knowledge gained about the electrical resistance of metals at low temperatures as a means of testing the purity of a metal almost rivalling the spectroscope in delicacy, and said that the facts collected would prove of importance in judging the validity of existing hypotheses of electric and magnetic action, while at the same time they opened out a wide field for fascinating research in a region hitherto but little explored.

A Synthesis of Humanity.

In the museum of one of our great medical schools there is a large case filled with bottles—a ghastly collection—for they contain the physical ingredients of a man. First, we see a large glass jar which holds the ninety-six pounds of water which the body of the average-sized man contains. Next comes a bottle with three pounds of white of egg—albumen—nine pounds fourteen ounces of pure glue, thirty-four and one-half pounds of fat, one pound of phosphate of lime, three ounces of sugar, one pound of carbonate of lime, one and one-half ounces of starch, seven ounces of calcic fluoride, six ounces of ordinary salt and six ounces of magnesium phosphate.

The case has another division, and this holds an array of bottles and cases which represent a man split up into his primary elements. These are ninety-seven pounds of oxygen, in volume enough to fill a case ten feet cubed; fifteen pounds of hydrogen, enough to fill under ordinary pressure five such cases; also three pounds thirteen ounces of nitrogen. All these gases are compressed into cases to save space. Then there is about a cubic foot of solid carbon, in front of which are ranged smaller bottles containing four ounces of chlorine gas, eight ounces of phosphorus, three and one-half ounces of sulphur, two and one-half of sodium, the same of potassium, two of magnesium, one-tenth of an ounce of iron and three pounds thirteen ounces of calcium.

To this must be added three and one-half ounces of fluorine in combination, for it has never yet been obtained pure, and a minute quantity of almost every element which the earth contains—silver, copper, gold, lead, arsenic, lithium, etc.—all of which are contained in the body of a man.

AT a recent meeting of the Sheffield Society of Engineers and Metallurgists, says the London *Machinery*, Professor T. Andrews spoke on the microscopic internal flames inducing fracture in steel. For many years he had been engaged in researches respecting deterioration by fatigue in metals. He said that if it were possible to produce a perfect metal, theoretically, there should be no deterioration by fatigue. He dealt with the causes of many of the so-called fractures of steel engineering structures. It was shown, by approximate actual micrometer measurements made by Mr. Andrews, that an ordinary railway axle is composed of about 2,313,178,300 primary crystals, the latter often being again subdivided into a still larger number of secondary crystals. He pointed out that many fractures in steel are due to the presence of innumerable internal micro-flaws in the metal, caused by the presence of very minute quantities of sulphur and other impurities. Sulphur was shown to be the most dangerous element in producing these micro-flaws, owing to the formation, during the solidification of large masses of steel, of sulphide of iron, which, on the final crystallization of the metal, located itself between the ultimate crystals of the steel. The deleterious influence of other impurities, such as phosphorus and silicon, was dealt with.

WITH the system of measuring the velocity of projectiles at present in vogue, it is necessary to employ screens, which are broken by every shot, and must be replaced or mended every time a shot is fired, says *Machinery*. This is very troublesome. Dr. Purcell Taylor, of London, has perfected a screen which is perpetually ready, and automatically adjusts itself after every shot in preparation for the next one, while it is rather quicker in action than the old screens. Dr. Purcell Taylor has also perfected a continuously registering chronograph, somewhat after the pattern of the one

be brought out four years ago. With the new chronograph and screens it is now possible to take velocities at the muzzle, at the target, and at any number of points between them; and all this while you may be peacefully slumbering in the chronograph house. It will also take velocities on continuous discharges of a machine gun.

Mechanical Progress.

Use of Compressed Air in Foundries.

The application of the air hoist to cranes may be made in an almost endless variety of ways to meet the requirements of foundries. The most common types are simple cylinder hoists, either vertical or horizontal, or in combination with a low-pressure hydraulic system. In many instances direct-acting hoists may be readily applied to hand-power cranes already in use without in the least interfering with the gearing, and at a very small expense. There is no noise, no jar, and the load is always balanced. In foundries where an overhead traveler cannot be installed, air hoists suspended from trolleys running on an overhead track answer very satisfactorily; and if hose couplings, similar to those used in connection with the ordinary air brake, are provided, by simply attaching the hose connection after the load is raised, the hoist may be run on the overhead track to any desired part of the establishment. This, says the *American Manufacturer*, is especially valuable in conveying flasks outside of the foundry to storage sheds, patterns to the pattern shop or finished castings to the machine shop. Air used in combination with a low-pressure hydraulic system gives the best results for heavy loads. By interposing the water between the elastic medium, air, and the load, we eliminate that element of danger which otherwise would be present in handling vessels of molten metal, as in foundry practice, and also obtain a sort of elastic positiveness which is so essential and desirable. In the actual work of molding, as in lifting copes and molds, drawing patterns and moving cores, the men are enabled to do about 50 per cent more work, and do it easier and better when equipped with a hydro-pneumatic hoist. Included in this percentage is the saving in repairs and the danger of losing castings.

In addition to operating movable hoists, air has proven its value for conveying pig iron to the top of the cupola, and for breaking up scrap by lifting a heavy weight, which is dropped some fifteen or eighteen feet. This pig-breaker broke three half pigs into three pieces each in one minute, and can easily break twenty tons of pig while a man is breaking up one ton by the old sledge method. A portable pneumatic drilling machine, for boring holes to weaken stiff castings, is used to advantage in connection with this breaker.

Cantilever Bridges.

The origin of the word "cantilever" is somewhat obscure. In modern engineering, a cantilever, strictly speaking, denotes a girder fixed at one end and otherwise unsupported. For convenience the collective term "cantilever bridge" is applied to a structure of which a cantilever proper forms a component part.

The first iron bridges of this type were built in 1876, although their advantages, under certain conditions, had been recognized at an earlier period.

The cantilever type of bridge seems destined to occupy a field intermediate between that held by the simple truss for moderate span lengths and that which will probably be covered by some form of suspension system for spans above 1500 or 2000 feet.

The conclusions as to the comparative merits of cantilever and non-continuous trusses and to the conditions affecting their relative cost, briefly summarized, are as follows:

For moderate span lengths, cantilever bridges are, under ordinary conditions, uneconomical compared with non-continuous ones, owing to (*a*) increased weight of anchor trusses and (*b*) added cost of shore anchorages in cantilever bridges of the Niagara type.

These advantages are balanced in part by the following favorable features: (*a*) Decreased weight of trusses in the cantilever arms and suspended span, as compared with simple trusses equal to their aggregate length; (*b*) decreased cost of erection.

For moderate span lengths a net comparison will show an economic advantage in favor of simple trusses, unless local conditions are such that the construction of false works would be attended by extraordinary expense.

With increasing span lengths certain advantageous features of the cantilever system become more emphasized, until a limit is reached, beyond which well-designed bridges of this type are more economical than simple trusses with the same arrangement of piers, aside from advantages incidental to their method of erection.

How Mineral Wool Is Made.

Of those who know mineral wool, or silicate cotton, as it is sometimes called, probably only a small number are familiar with the simple process by which it is made. The wool itself, serving a variety of useful purposes, as a non-conducting covering against heat and cold alike for steam pipes and cold-storage room walls, as a sound deadener in floors and buildings, and as a means of fireproofing, is, as its name implies, a soft and woolly substance, consisting of a mass of very fine mineral fibers interlacing one another in every direction, and thus forming an endless number of minute air cells. The wool appears on the market in a variety of colors, principally white, but often yellow or gray, and occasionally quite dark, and is made by converting scoriæ and certain rocks, while in a molten state, into a fibrous condition by a steam blast directed against the liquid material. Blast-furnace slag forms the raw material for one variety of the wool and sandstone for another, yielding, respectively, slag wool and rock wool, the latter being preferable for pipe covering, because of the absence of sulphur, which, with moisture present, becomes an active corroding agent. The furnace slag or the rock, as the case may be, is melted in a large cupola, and as it trickles out at the tap hole in a somewhat sluggish stream it meets a high-pressure steam jet which atomizes the woolen material, if it may be so termed, blowing it in fleecy clouds into the storage room provided for it. Soft and downy, the stuff settles wherever a resting place offers itself, the heavier wool coming down first, while the lighter portions are blown further along by the force of the steam and settle in the more distant parts of the room. The material thus naturally grades itself into varieties of different qualities. One thousand pounds of wool per hour are turned out by one of the cupolas; and after the storage room has been blown full, the flocculent mass is pushed into bags, ready for the market. The whole process affords an admirable and interesting illustration of the utilization of a formerly waste product.

Among the papers contained in the last volume to hand of consular reports issued by the State Department is one on the "Use of Tactorium in Europe," comprising answers from several consuls to the department's request for information on the subject. Tactorium consists of a galvanized iron web covered with a gelatinous substance, and is translucent, but not transparent. It is described by a manufacturer as a substance that (1) can be bent without being broken; (2) is both tough and flexible; (3) is not softened by the rays of the sun; (4) is non-soluble; (5) is not affected by severe cold; (6) is a bad conductor of heat; (7) is well adapted for roofs, on account of its extreme lightness; (8) when exposed to the sun it loses its original yellowish color in time and becomes harder and more durable; (9) can be made by a very cheap process to imitate stained glass in such a manner that it cannot be recognized from the genuine article; (10) can be cut by shears nailed to wood and transported without danger; (11) can be easily repaired in case it is cut; (12) does not break; and (13) is well adapted for factory windows and skylights for hothouses, market halls, verandas, transportable buildings and for roofing. The consuls state that it is sold in small quantities in a few places, but that it is not known to the general public, and as a commercial product is still an experiment.

Practical Information.

Electing a President.

The aggregate number of electors this year will be 447, of which a majority is 224. These are divided as follows: Alabama 11, Arkansas 3, California 9, Colorado 4, Connecticut 6, Delaware 3, Florida 4, Georgia 13, Idaho 3, Illinois 24, Indiana 15, Iowa 13, Kansas 10, Kentucky 13, Louisiana 8, Maine 6, Maryland 8, Massachusetts 15, Michigan 14, Minnesota 9, Mississippi 9, Missouri 17, Montana 3, Nebraska 8, Nevada 3, New Hampshire 4, New Jersey 10, New York 36, North Carolina 11, North Dakota 3, Ohio 23, Oregon 4, Pennsylvania 32, Rhode Island 4, South Carolina 9, South Dakota 4, Tennessee 12, Texas 15, Utah 3, Vermont 4, Virginia 12, Washington 4, West Virginia 6, Wisconsin 12 and Wyoming 3. The Territories and the District of Columbia, which have representation in the nominating conventions of both parties, have no voice in the electoral college. The electors of each State meet at the capital of the State "on the first Wednesday in December in the year in which they are appointed," and cast the vote of the State for the candidate of the party by which they were elected. In case no candidates receive a majority of all the electors, the House of Representatives shall elect, the vote being taken by States, each State casting one vote.

When the electors meet in their respective States and cast their ballots for President and Vice-President, "they shall make distinct lists of all persons voted for as President and of all persons voted for as Vice-President, and of the number of votes for each, which lists they shall sign and certify and transmit sealed to the seat of government of the United States, directed to the President of the Senate." On the second Wednesday in February succeeding the meeting of the electors in the several States, Congress shall, in joint session in the Hall of Representatives, the President of the Senate presiding, open the certificates, count the votes and declare the result, if either candidate shall have a majority. In the event that neither candidate has been elected, the House of Representatives elects the President, being limited to the three candidates having received the highest vote of electors, and the Senate elects the Vice-President, a majority of the whole number being necessary to a choice.

Resin, or crude turpentine, is the material obtained by tapping or bleeding the trees. Spirits of turpentine is the liquid obtained by distilling the crude resin. Rosin, or colophony, is the residue after the distillation of resin. Common pitch is the residue from the dry distillation of rosin. Brewers' pitch, which is used for coating the interior of beer kegs and barrels, is obtained by stopping the distillation of resin before all the oil has been distilled. Tar is produced by distilling the wood itself, and oil of tar is obtained by distilling the tar. Each of these articles is separated commercially into several different grades, and every grade has its own name.

A French company has obtained a permit from the Chinese Government to prospect for minerals in the province of Tse-Chuen, near the frontier of Tibet. A geologist and several engineers left Shanghai in July on their trip into the interior. The distance from Shanghai to Tse-Chuen is 2000 miles and cannot be covered under three months. The party will travel by river, up the Yang-tse-Kiang, the Kialing and Mow-Kna rivers.

Money of the World.

The Philadelphia *Press* says: "The money of the world is distributed as follows:

Countries.	*Gold.*	*Silver.*
United States*	$600,100,000	$325,600,000
United Kingdom	580,000,000	115,000,000
France	850,000,000	487,900,000
Germany	62,000,000	215,000,000
Belgium	55,000,000	54,900,000
Italy	98,200,000	41,400,000
Switzerland	14,900,000	15,100,000
Spain	40,000,000	166,000,000
Portugal	38,000,000	24,800,000
Austria	140,000,000	120,000,000
Netherlands	29,200,000	56,200,000
Norway	7,500,000	2,000,000
Sweden	8,000,000	4,800,000
Denmark	14,500,000	5,400,000
Russia	480,000,000	48,000,000
Turkey	50,000,000	40,000,000
Australia	115,000,000	7,000,000
Egypt	120,000,000	15,000,000
Mexico	5,000,000	55,000,000
Central America	500,000	12,000,000
South America	40,000,000	30,000,000
Japan	80,000,000	84,300,000
India	....	950,000,000
China	....	750,000,000
Canada	14,000,000	5,000,000
Cuba	18,000,000	1,500,000
Totals	$4,068,800,000	$4,070,800,000

Countries.	*Paper.*	*Per capita— Gold.*	*Silver.*
United States*	$383,300,000	$ 8 41	$ 8 77
United Kingdom	113,400,000	14 91	2 96
France	32,100,000	22 19	12 94
Germany	80,400,000	12 21	4 20
Belgium	65,400,000	8 73	8 71
Italy	191,800,000	3 20	1 35
Switzerland	.....	4 97	5 00
Spain	83,700,000	2 28	9 49
Portugal	55,100,000	7 45	4 86
Austria	204,300,000	3 22	2 76
Netherlands	28,600,000	6 21	11 96
Norway	3,800,000	3 75	1 00
Sweden	2,100,000	1 66	1 00
Denmark	5,400,000	6 30	2 35
Russia	539,000,000	3 80	38
Turkey	.....	2 27	1 82
Australia	.....	24 47	1 49
Egypt	.....	17 65	2 20
Mexico	2,000,000	41	4 54
Central America	8,000,000	09	2 14
South America	550,000,000	1 11	83
Japan	.....	1 95	2 05
India	37,000,000	....	3 21
China	.....	....	2 08
Canada	20,000,000	2 92	1 04
Cuba	.....	10 00	83
Totals	$2,436,500,000	....	....

*July 1, 1896; all other countries, January 1, 1895.

How Piling is Driven in Bavaria.

Henry A. Carpenter, United States commercial agent at Furth, Bavaria, writing of the opening in that country for American manufacturers, says:

"The manner of driving piling here would indeed, make an American contractor smile. The method is as follows: A simple block and fall arrangement is rigged up over the pile and to the end of the rope running the pulley and fastened to the weight is about twenty-five smaller ropes with hand pieces. Twenty-five men grab these and at a signal from one of their number, all pull together. The weight goes up about eighteen inches or two feet, when the men relax their hold and the weight drops. It is unnecessary to state how long it takes by such a method to drive a pile, or how much more effectively a small dummy engine would do the work. In the erection of buildings the same tedious process is employed; for every stone to be raised requires the strength of a pair of horses and about fifteen men tugging away at the ropes. The machinery manufactured and used in America for such purposes would do away with this clumsy method, but none of it seems to be in the market here."

According to President Tyler, of the Society of Chemical Industry of England, twenty years ago Great Britain was the largest producer of plate glass; then followed France, Belgium and Germany. Now, mainly in consequence of the action of protective tariffs, the position is reversed, and England takes the last place, the first being the United States, followed by Belgium, France, with Germany about equal to England.

A well-known medical authority says in a recent work that cheese should be eaten at least once a day. "It is the most valuable animal food obtainable," he says, "from two to three times as nutritious as the same money value of ordinary meat."

Mining Summary.

CALIFORNIA.

Amador.

The Pocahontas Improvement Company, a company organized in West Virginia to work the Pocahontas mine at Drytown, is seeking a contract for sinking a double-compartment shaft 600 feet deep. Preliminary work was commenced several days ago.

Ledger: The Clearwater, in the Pioneer district, lately bought by J. A. Greenwood, shows a two-foot ledge of good ore.

The Kelley mine is being opened up under the management of the new owners.

G. P. Rixford of San Francisco has secured the Smith interest in the Reward mine near Pine Grove and intends to put in a new mill of ten stamps in place of the old one.

Dispatch: It is understood that work will soon be resumed on the Contention quartz mine.

A strike has been made in the Argonaut mine of ore of good milling quality.

In the Blue mine near West Point a good prospect was found at a depth of fifteen feet and at seventy-five feet paying rock was taken out.

Prospect: The Sheffield Consolidated mine which is owned by the same syndicate as the Hexter, in a four day's run yielded $900. Three tons of sulphurets shipped to Selby's smelting works netted $100 to the ton.

Republican: The Bellwether shaft is now down 156 feet and 200 feet more will be sunk.

Work at the Jackson Gate mine is being pushed along rapidly. The shaft is now 300 feet deep.

Butte.

The old mining ground of Hansonville, near the southern line of Butte county, is proving as rich as it was in early days. The pay is in a narrow strip of decayed quartz not more than two inches wide, with occasional pockets.

W. Greenleaf and his son are sinking a prospecting shaft on the Lloyd place, on the site of the old mining town of Lynchburg. They expect to strike good pay gravel at a depth of twenty feet.

In the Mt. Ida quartz mine the shaft is down 50 feet; ledge 24 inches. Four men are employed. The new 5-stamp mill is crushing quartz.

At the Standard mine work is resumed under a new company composed of Oregon City business men, who will work the mine under different management.

At the Magalia mine there are 45 men employed; the mine is reported as paying handsomely.

The English Company has 25 men at work on Butte creek.

E. C. Paxton, superintendent of the Peter Woods mine near the Forks of Butte, has 35 men at work digging roads and getting things in shape to put machinery on the mine. This mine is owned by the English syndicate.

Register: E. C. Paxton of the Peter Woods mine, near the Forks of Butte, has thirty-five men at work digging roads and getting things in shape to put machinery on the mine, which is owned by the English Syndicate.

San Francisco people are at work developing the Ramona mine and expect to have a mill running within sixty days.

T. H. Lawton is opening a new quartz mine about two and a half miles from Enterprise and on what was formerly a very rich stream, Powell creek.

Calaveras.

Prospect: At the Rising Star mine near Central Hill, a shaft to tap the channel ran into gravel last week that prospects well. The property is being worked under a bond by W. H. Snedaker and J. T. Sullivan. New hoisting machines will soon be on the ground.

Chronicle: At the Soap Root mine sinking is going steadily on, a good ledge of rich rock still showing in the bottom. This company has purchased a gravel claim on the Middle Fork and piping will soon commence.

At the Crown Point mine at the head of the Calaveras river the owners propose to enlarge the shaft to 8x8 and continue sinking.

At the Keystone mine sinking is being prosecuted rapidly, eight hour shifts being employed. There is a 3-foot ledge in the bottom of the shaft of ore that assays well.

It is reported that the Petticoat mine will soon start up.

Del Norte.

Eastern men are in Waldo looking at the copper prospects owned by the Baltimore people, who took machinery in last summer to be used in the extraction of the ore.

The Coon Mountain Gravel Mining Company have 20 men at work. They will probably employ 50 men before winter sets in.

Three copper mining men from Grant's Pass visited the Low Divide country and located two water rights.

Happy Camp and vicinity is reported to be the liveliest mining section in Siskiyou county. Sales of mines in that section to Eastern and Colorado capitalists have brought this about.

El Dorado.

(Special Correspondence).—Graeter, Cook & Elvige are preparing for the erection of a 10-stamp mill on their gravel claim, one mile south of here. They will operate on the same well-defined channel from which the Franklin is making its regular monthly bullion shipments.

J. H. Bradley reports that he will at once resume work on the Eagle Company's 700-foot tunnel near Grizzly Flat. The ledge is said to be 7 feet, of good ore.

Channel mining is receiving considerable attention. Two large properties were recently bonded, within a short distance of town, upon which development work is to be begun shortly.

Eight men are at work on a bar in the Cosumnes river, twenty-two miles east of Placerville. They are 10 feet below water level. The peculiar formation of marble and copper-bearing ore, mingled among the boulders and gravel, is an interesting study, as they are found in the chimneys of the bar.

Hank Roberts is developing three ledges at Henry's Diggings, twenty-five miles southeast of Placerville. The ore bodies, though small, are said to be high grade.

Melton & Roberts are diligently pursuing development work on the Rosebud, a few miles above Fairplay.

A party of five are fluming the American river about three miles from town, in the neighborhood of Chili Bar, famous in its history for rich production of coarse gold.

New life is manifesting itself in mining interests in the famed Kelsy district, six miles north of Placerville. Two capitalists have put prospectors to work on several pieces, some on new and others on old-time quartz ground.

Development work on the copper property bonded by Head & Bind is progressing in a satisfactory manner. The second tunnel has reached about 80 feet, passing through a formation of crystallized limestone.

It is creditably reported that the Anti-Debris Association has withdrawn its objections in the Mulky Spreckels case. This being the case, and a permit having recently been obtained from the commission, work will be resumed without delay.

Placerville, Cal., August 31st, '96.

The Stanley gravel mine at Smith's Flat hss been started up.

Inyo.

Register: Sanger and Danielson, of Big Pine, have returns from assays of copper ore samples from their lead east of Keeler, thirty miles. The lead is 75 feet wide and shows a good percentage of copper.

Kern.

The old Rocheford mill is being put into shape for running work.

The Burton Brothers have developed a ledge from thirty to forty feet wide on Piute mountain, near Mojave. They milled seventy tons that brought them $14 a ton.

The Warrenton mine, near Kernville, is to be thoroughly developed before any of the ore is milled. Three shifts are sinking a shaft and the 300-foot level will soon be reached. Thus far $22,000 has been expended on this mine.

A ten-stamp mill is crushing ore for the lessess of the Big Blue property, and the rock is turning out well. All the men are subject to a twenty-four hours notice to move, and should the mine be sold, the purchasers can take possession and proceed with the work the next day.

The new Tremain stamp mill at Garlock is up and ready for work on a quantity of Burcham, Mooers & Singleton ore.

A tailing pond is being scooped out in the wash below Garlock for the reception of the Rand Mining Company's slickens. Sluice boxes with blanketed bottoms have been put in, and it is argued that the saving in gold by this method will equal that of the best concentrators.

The machinery for the Rand Mining Company's pumping plant has arrived at Goler and is being set up. Water is coming into the shaft so fast that it cannot be bailed dry and pumping must be resorted to. The water supply is assured and the new forty-stamp mill will be put up at once.

Dry washing at Goler and back of Garlock is slightly on the increase.

Lassen.

Mail: The Hayden Hill Gold Eagle Mining Company have their shaft now down 325 feet and have given a contract to sink 110 feet farther. From the 220-foot level 20 to 25 tons of ore a day is being taken out to their two 10-stamp mills on Willow creek.

For the Hayseed mine a new 10-stamp mill has been erected on Willow creek.

The Blue Bell, one of the oldest locations at Hayden Hill, has been reopened.

At the Big Tunnel mine the tunnel to penetrate Hayden Hill is now in 1424 feet. A small vein carrying a few colors is occasionally cut, but nothing has yet been encountered which would justify developing. The tunnel will tap a region much deeper than any other developments made, and the result is anxiously looked for.

Mariposa.

Miner: Walser and Dunn, of Fresno, who have the property of Michael Dugan bonded, are opening up the mine. They are working on the hanging wall with a well defined ledge and are also running a tunnel at the foot of of the hill to cut the ledge at quite a depth.

Development at the Horseshoe mine near Hunter's valley is progressing, the new shaft being sunk as rapidly as powder and steel can sink it.

The mine recently bought by John Rosenfeld & Sons, of San Francisco, situated near the old Sampson ranch, has ceased operations for a while.

At the Dorse mine the main shaft is down about 300 feet, besides several drifts run each way on the vein.

San Francisco people are running a tunnel in the vein to develop the Burnett & Dabney mine at Sherlocks.

Mono.

Union: Much work is being done at the Jordan mines preparatory to the erection of a 40-stamp mill. Bridgeporters may soon look for the arrival of teams with machinery, etc., for that camp. It will be a bonanza for teamsters, as there will be about 250 tons, more or less, of freight to come in from Carson.

The Standard Con. M. Co. will erect another electric plant on the river a few miles below Bridgeport.

Nevada.

At the Cadmus mine, on Deer creek, opposite the Champion, some rich ore has lately been struck. The shaft is now down 260 feet and is being sunk as rapidly as possible. It has not yet been decided whether the west drift will be started at the 300 or 400 level.

Work is progressing favorably at the Home mine on Deer creek, near the Cadmus.

The loss by fire at the Providence mine has been appraised at $7000. The loss of gold can not be estimated until a cleanup is made. The contract to rebuild the works has been let to W. Marsh.

Transcript: Negotiations have been pending for some time for the sale of the South Idaho mine in Nevada county, and a few days ago a telegram was received from Buffalo, N. Y., stating that the sale had been closed.

Three carloads of machinery and two cars of cement have been received at Colfax for the Allison Ranch mine at Grass Valley. Five carloads of machinery are yet to follow from San Francisco. When thoroughly equipped this mine it is claimed will work a force of 300 men.

Tidings: Work has again been commenced on the old Pennsylvania mine, in Brown's valley. The property includes the two Pennsylvanias and the Jefferson which years ago paid nearly $3,000,000 in dividends. The Webb Mining Company, who own the property, have lately erected a mill at a cost of $60,000.

Transcript: The Eagle Bird mine, near Washington, was bid in at commissioner's sale by the creditors for $3,285. There is a 30-stamp mill and a fine hoisting plant on the property.

Union: The Culbertson, at Graniteville, is working eighteen men and taking out good ore.

In the Live Yankee richer pay gravel has been found at the end of the additional 600 feet of tunnel that has been run lately.

The Red Dog Mining Company are making good progress at their gravel mine near You Bet. The incline shaft is now down about 90 feet it is expected that gravel will be struck at a depth of 180 feet.

Placer.

Sentinel: The tunnel at the Eureka Consolidated drift mine above Forest Hill is now in 1480 feet.

The force of men at the Mayflower mine has been increased to 75. The mill is running steadily. They are taking out good gravel at the south end and also in the Orono channel.

Plumas.

National-Bulletin: L. F. Tefft recently took a $50-nugget from the Concordia gravel mine, near Cromberg, in which he is opening up new ground.

At the Garnett, formerly the North American and Bunker Hill properties, there are at present employed about 60 men. A large part of this force is at work on the outside, preparing for the winter, cutting logs for an impounding dam, digging ditches, laying pipe for the hydraulic works and cutting timbers for underground work.

Independent: Judge Thos. E. Hayden of Reno has purchased from the Sierra Lumber Co. their half interest in the Hapgood & Black quartz mill situated near McLear's, in Mohawk valley, and is perfecting arrangements for water therefore, when, it is understood, the mill will be opened for custom crushing. He has also, in company with John Sparks of Reno, purchased from D. M. Bull an undivided one-fourth interest in the Verdi and Verdi Extension placer claims on Mill creek.

Riverside.

Fifteen of the twenty stamps of the Santa Rosa gold mines, in Riverside county, are at work and about forty men are employed.

San Diego.

W. W. Stewart, receiver of the Golden Cross Mining and Milling Company at Hedges, has filed a report in the Superior Court covering the period from the time he took charge of the property, June 7, 1896, to August 15th. Receiver Stewart states in his report that at the beginning of his receivership the 40-stamp mill was idle, but has been dropping almost constantly ever since. The total expenses of the company from June 8th to August 15th were $48,269.73. This included $26,548.43 paid to miners, etc., $13,485.09 for milling, $10,499.55 expended in construction, and $3,959.53 for general administrative and office expenses. The sum of $6,222.87 was realized from the stage, water account, house account, boarding house and store, leaving $48,269.73 amount expended. The total receipts reached $54,460.17, and included mint returns of about $46,286.18.

Bailey Bros., of Banner, have crushed 30 tons of rock from the Redmond mine, which went $80 per ton.

At Picacho Deputy Sheriff Johnson levied an attachment on the California Picacho Gold Placer Mines Company's pumping plant and placer mines, which belong to the Picacho Gold Placer Mines Company, Limited, of London.

At Picacho the Golden Dream Mining Company has 7 men at work on its mines, which are situated in the Old Providencia mining district on the Colorado river, below Picacho. The men are paid every Saturday and the contractors when each shaft or piece of work is completed. The Golden Dream Company has secured the Alcyon and the Yellow Gold group of mines—fifteen in all—and will put up a new mill this fall.

The New York company that purchased the Dr. Jayne group of mines has had an estimate made of what it will cost to put the mines and the mill into good shape for crushing 125 tons of ore per day.

An English company have a group of 21 mines in the Picacho basin, adjacent to the Goshen mine of the Jayne group, which they will open up when cool weather comes, and for the working of the ores of which they will put up a mill at the Colorado river.

Twenty miners are employed in the Red Cloud silver mines, five miles from Picacho.

Shasta.

Courier: The new ten-stamp mill for the Roberts group of mines is en route to the Gulch and will soon be put up. The engine will have power to run forty stamps and these will be added when required.

The Iler Brothers own a group of quartz mines on Spring creek that they have put much development work on and which have large bodies of ore in sight.

Free Press: The new smelter of the Mountain Mines, Limited, will not be completed for two weeks, but work is going steadily on. The company has 340 men on its payroll and is distributing about $20,000 per month.

Searchlight: Mining news from Harrison gulch continues more and more exciting and many prospectors from Tehama and Shasta counties have gone there.

The great Sunny Hill tunnel is now in a distance of 350 feet.

L. Rhodes has disposed of some of his mining interests at Harrison gulch for $10,000.

The Trinity Consolidated will again start the mill on Dog creek and have in contemplation a tunnel from the mill to the ledge, cutting off all the surface work. Ore bodies already uncovered in the property, it is said, warrant the outlay.

Murray Bros., who recently came in possession of the old Murray and Hull properties above Shasta, have discovered a fairly rich ledge. The crosscut shows it to be 6 feet in width, 3 feet of which is paying ore, estimated to yield about $10 per ton.

Sierra.

The Sierra Gold Mining Company recently bought a mine above Downieville which they have proceeded to develop. They have purchased the 20-stamp mill on the Mt. Moriah mine between Forest City and Downieville.

Siskiyou.

Journal: The Garrett mine, near the mouth of Scott river, is running in full blast.

The Commodore mine, on Barkhouse creek, still continues to produce excellent ore, and the owners, Humphrey and Quigley, expect to make a better cleanup than ever next time.

A couple of tons of rock which was crushed from the Katie-May mine on Greenhorn, owned by Bailey & Carrick, went $100 to the ton.

The new 5-stamp quartz mill which is being erected by Chamberlain & Timmons on Mill creek, near Scott bar, is about completed and they will soon commence crushing the quartz from their mine, the Mabel. The Columbia, which is located on the same vein, is also producing good ore this year, which is taken to the Columbia mill, on Mill creek, for crushing.

The Gum Boot quartz ledge, owned by Simon Bros. & Co., has been worked this season by the owners. It is one of the largest ledges discovered in the past two or three years in the county.

Trinity.

The Poker Bar Mining Company has forty-five men employed and work in getting things in readiness for next season is being actively pushed. The machinery for the elevator is being put in place.

On the Hill mine on Coffee creek a mill with a capacity of twenty tons will soon be erected. The ore from this mine is free milling, running from $50 to $70 per ton. There are eleven men employed.

Tuolumne.

Independent: The Rawhide has received a new steel cable weighing some 2500 pounds.

The engine for the Shawmut hoist is on the ground and is now in course of erection.

The electric plant of the Santa Ysabel is almost completed and will soon be in active operation.

At the Bellview mine the 10-stamp mill is running regularly and stoping is in progress in the 400 and 500-foot levels.

The Soulsby mine is erecting a new hoisting works. Rails are also being laid for conveying the ore from the hoist to the mill. The new shaft is down 150 feet.

The Star mine, owned by the Wilman Bros., is having erected a three-ton furnace chlorination works, and will also shortly put in a four-drill air compressor.

Union Democrat: The big pump in the Confidence mine being worked under bond from Baker & Hamilton has taken out the water down to the 600-foot level. The lowest workings run down to 800. They have found on nearly every level bodies of good milling ore that was passed over years ago as being too low grade to work profitably. Ore that would not come near paying twenty years ago can now be handled at a big profit.

OREGON.

Mining Journal: W. A. Clark, the millionaire copper magnate of Butte, Montana, came in from the north and went out with Captain Brown to the copper ledges on the Illinois last week.

Jacksonville *News*: Flagstaff district, Baker county, is attracting considerable attention from the prospectors. The Bradbury Bros. have found a new ledge, 4 feet wide, near the Cyclone. Scott, Phillips & Kirk have a 6-foot extension of the Flaffstaff. H. S. Bowen and J. M. Lachner have bonded the Sound Money group to Chicago parties. The Red Jacket is showing ore assaying from $10 to $30 gold.

G. R. Hammersly & Co. of Gold Hill are wingdaming the Rogue river at that place.

WASHINGTON.

Post-Intelligencer: The Swauk placer mining district, the oldest of its kind in the State, is developing into a quartz district, and side by side with the bedrock tunnels and sluice boxes of the placers are twelve arrastras grinding free milling ore, which gives good returns.

Spokesman-Review: In the Okanogan district there are more men working in developing the mining interests than since 1892.

BRITISH COLUMBIA.

Spokesman-Review: The Crown Point mine in the Rossland district has been sold to a Toronto syndicate for, it is said, $230,000. They propose to expend $75,000 more in devel-

opment work. The same syndicate has been given an option on a bond on the Robert E. Lee and Maid of Erin.

The new discoveries recently made near Christina lake, in the Boundary creek region, are attracting considerable attention to that section.

Advices from the outlying districts of Murphy, Sullivan and China creeks are that numerous prospects, upon which development work is being done are showing up wonderfully well.

A new mill in the Noble Five will be in operation Nov. 1.

The Novelty mine in the Rossland district has been sold for $17,500 to a syndicate represented by John R. Reavis.

The Spotted Tail group of mines lying near the Crown Point has been sold to a Montreal syndicate for $8000.

The Chicago and Montana Mining Company, of Libby, Mont., are driving a 200-foot tunnel on the face of their old one and are running a new 150-foot tunnel on the air shaft and putting in a 70-horse power steam engine.

Post-Intelligencer: A rich strike is reported in the Silver Belle group in the south belt lately purchased by a capitalist from Everett. A vein 12 feet wide of steel galena, carrying gold, assays very well.

Two cars of ore, the first shipment from the Apex mine on Money creek have been sent to the smelter. Packing the shipment to the railroad was $12 a ton, a little over $500.

Charles P. Oudin has bonded the Debs, Emma R. and Prince of Wales mineral claims, adjoining the R. G. Sovereign on Lookout mountain near Trail, for $30,000, 10 per cent down, the balance in three, six and nine months.

At the Van Anda mine on Texada island 100 tons of copper ore is ready for shipment and the owners claim that they will continue to send ore to the smelters regularly. The assays are claimed to be high in copper with a little gold which increases as they go down.

Nelson *Miner:* Some new locations have been made on Upper Arrow lake that assay high in gold and silver.

Continued finds are reported from the north fork of the Salmon as well as from many other parts of the district.

A 3-foot vein of carbonate and galena has been discovered on Thompson and Sutro's claim near Sandon. The mine is within 500 feet of the railway.

The War Eagle is shipping about 30 tons of ore a day to the Trail smelter.

A strike of highgrade ore has been made on the Mugwump. This fractional claim lies between the City of Spokane, Pilgrim, Iron Mask and Virginia.

The new main shaft of the Le Roi is nearly down to the 500-foot level. The ore that is being taken from this shaft is the richest that has yet been found in the mine. It is a fine grained chalcopyrite with little or no gangue matter.

Kootenaian: Some men sent out by Kaslo people in the Duncan river have made a discovery of free milling ore that they claim will go $20 per ton and the ledge is said to be 40 feet in width.

Ore has again been struck in the lower tunnel of the Enterprise, and the ledge is widening and improving.

The Nelson *Miner* gives the following data as to the output of Kootenay mines:

ORE TREATED IN KOOTENAY.

At Nelson	19,114	
At Pilot Bay	19,119	
At Trail*	9,606	
		47,839

ORE EXPORTED.

From Slocan via Kaslo	6,951	
Slocan via Nakusp	4,863½	
Ainsworth	311½	
Trail Creek (gold ore)	5,154	17,280
Tons		65,119

* In addition 505 tons of imported ore have been treated at Trail.

PRODUCE OF SMELTERS.

	Tons.
Nelson (Hall Mines) Matte	1625
Pilot Bay, silver lead bullion	1012½
Trail Smelter	1052
	3689½

Rossland *Miner:* The Phœnix Consolidated Mining Co., with a capital stock of $750,000, has recently been formed to work the Phœnix and other properties on the north fork of Carpenter creek.

Ore has again been struck in the lower tunnel of the Enterprise, and the ledge is widening and improving. The mineral is left standing in all the workings.

L. W. Northey, representing a syndicate of New York men, has taken an option to bond at $75,000, for a year, either one of two groups at the head of the north fork of the Salmon river. One group consists of the Secretary, White House and Senate, known as the White House group, and the other, known as the Deserter group, consists of the Deserter, Blue John and Bornite.

In the North Star mine, on Huckleberry hill, the ore is galena, which averages from 55 to 100 ounces in silver and 68 per cent lead. This company has shipped about 5000 tons this season and there are at least 100,000 tons in sight at the present time.

The Mount Adams group is reported bonded to Philadelphia capitalists for $110,000. Work was commenced on them a few days ago. These properties are owned partly by Captain R. C. Adams.

ALASKA.

News: At Funter Bay the new mill of the Alaska-Willoughby Gold Mining Company is crushing about 40 tons of ore per day. The cleanups have been very satisfactory. Development work is being prosecuted simultaneously on several of the claims, several of them lying in such position along the beach as to be available with one line of track.

On the Mountain group, over the Willoughby property, a force of men is kept constantly at work since the sale of the group was affected some months ago by Geo. and Chas. Garside. The company that bought these claims, said to be a Boston syndicate, it is thought are desirous of securing control of the Willoughby claims and mill with the purpose of increasing its capacity to handle ore from both groups of claims.

UTAH.

Tribune: P. Conley and others of St. Paul, Minn., have purchased the Hawkeye of Park City. It is their intention to perfect the machinery with which work was previously done in the mine and to begin extracting ore in a few weeks.

The Mingo smelter will be closed down as soon as the ores now on hand are worked up.

Contractors have begun the work of improving the Sacramento mill at Mercur.

The Marion has a new vein which is quite rich. It lies immediately on top of the silver vein, and about 200 feet below the gold vein.

The Wonder shaft is down 380 feet and is still in a hard limestone formation.

The final payment of $10,000 having been made, the title to the Golden Gate Extension is now clear, and the company will continue its exploration with every assurance that at a depth of about 400 feet the ore body will be encountered. At present the shaft upon the Golden Gate Extension has attained a depth of 125 feet.

It is announced that the Hanauer smelter would start up again early in September.

The Ajax Mining Company will early next month put through the Sioux mill 200 tons of ore for the purpose of determining the best method for milling it. It is claimed that there are now 200,000 tons of milling ore blocked out. The company will commence the erection of the mill as soon as experiments are completed.

At Park City the Peck Concentrating Company has closed a contract with the Anchor company for the big tailings dump lying at the Anchor concentrator, and that will be the first dirt handled by the new mill when completed. The method of moving the dump to the mill proposed is a pipe-line, the dump being composed entirely of very fine material.

The Silver King Company will increase the number of its employees early this month.

The Daly West Company's new hoisting plant is now in active operation and work through the shaft begun.

At the Comstock mine at Park City to handle and extract the ore economically there is now being driven into the hill a tunnel to connect with the vein. It has been run a distance of 2000 feet already, and is now in the body of silver and lead ore for which the search has been made, and if shipments are not made in the next few weeks it will be on account of the ruinously low price of silver and lead.

The Northern Light at Bingham has suspended shipments owing to the low prices prevailing in the metal market.

Work progresses steadily on the Hoogley mine at Bingham. It has uncovered some very high-grade ore.

The Ophir Hill Mining Company at Ophir is producing 1000 tons a month, notwithstanding the depressed condition of the metal market.

R. H. Cavell is opening up the Buckhorn, that many years ago was among the most prominent of Ophir's properties. The ore at that time occurred in high-grade chambers, and the opinion is expressed that with exploration they will be found again.

IDAHO.

The prospects for increased activity in the Pierce City districts grow both in placer and quartz mining. On Reed's creek a company are opening up a large placer claim, and have 25 men employed. The American Placer Mining Company, after expending $30,000, have commenced washing pay dirt.

The Bingham Placer Mining Company has oraganized at Salt Lake, Utah, capital stock $250,000, to handle 5000 yards of gravel a day. A complete hydraulic plant will be put in.

Preparations are being made to work the gravels in St. Joe basin on an extensive scale. Allen, Sutherland & Wendel have secured claims in there aggregating 440 acres, together with all the water rights necessary, and will begin building ditches soon.

Avalanche: Steam was raised lately at the Henrietta hoist, for the first time in eight years. It is now started up under a new organization and is to be known as the "Big I."

MONTANA.

The waters of Grasshopper creek, in Beaverhead county, are being worked with new methods for the gold that lies within their sands. Two companies organized in Chicago, with eastern capital, are dredging the creek and operating a centrifugal pump, and both are believed to be making a great deal of money.

The machinery is on a boat in the creek, floating in 35 feet of water. The pay gravel is raised from the bottom of the river by a series of buckets running on two heavy iron rods that are set on a swivel. They are hung on knuckles so that as they rise to the top they empty themselves into a grizzly. That separates the gravel from the sand, and the remaining material is raised to the sluice boxes on the top of the boat. The enterprise represents an outlay of $100,000, but it looks as if the money would be taken out of the creek before the season was over.

SOUTH DAKOTA.

The Union Hill Mining Company have started fires in their smelter and commenced treating ores. Development work on the mines has resulted in the opening up of hitherto unknown ore bodies.

The 20-stamp mill, formerly known as the Hildebrand mill, has been purchased by P. L. Gibbs to work on ore from the Omega mine, situated on the divide between Terraville and Central.

Black Hills *Times:* The ore shoot now exposed in the Tornado workings shows a breast 300 feet wide and from 5 to 9 feet thick, from which a daily average of 150 tons of pay ore is extracted. The property is owned by the Golden Reward Company and could supply a plant of 500 tons daily capacity just as readily as it does the present one of 125 tons.

The Pluma M. & M. Co. have men at work putting the mine and mill in shape to resume operations, and in a few days both will be running. The mines of the company adjoin the property of the Homestake and Hawkeye Mining Companies.

A geological survey is to be made of the siliceous ore belt in the vicinity of Portland, Squaw Creek and Upper Spearfish under the direction of the State School of Mines.

The Union Hill M. Company have their smelter and stamp mill in operation.

Miner: Work has been begun on the cyanide plant at the Keystone mill, which will have a capacity of 10 tons.

WYOMING.

George Moyer is building a cupola in the mining belt on Casper mountain to smelt copper ore mined there and will use a flux made from natural soda.

D. J. Sheean of Caspar has discovered a vein of asbestos on Ferris mountain. He will submit samples of his discovery to experts in order to ascertain its commercial value. The samples indicate that the product is equal to the Canadian asbestos.

COLORADO.

Denver *Republican:* At Cripple Creek a strike has been made in the Granite Hill. Two feet of the ore gives above $250 a ton on sample assays, while picked specimens showing free gold run much higher. From the strike of the vein it is thought to be the extension of the one opened at the El Paso in excavating for a power plant.

Smith & Fogleman having forfeited their $35,000 bond on the Keystone, on Gold hill, Miles McDonald, the owner, gave C. B. Gentry a new bond running for one year in the sum of $65,000.

During the past 36 years the following mines of Gilpin county have produced more than $1,000,000: The Gregory-Bobtail, over $17,000,000, has now 1800 feet of vein matter exposed and ready for extraction, and was recently sold to a syndicate of English capitalists for $1,050,000; Gunnell mine more than $4,000,000, and is still being worked; California over $4,000,000 and is producing regularly; Perigo more than $3,000,000 and, after a long period of idleness due to litigation, is again in operation and producing; Burroughs has produced more than $3,000,000 and is still taking out ore; Hubert & Prize vein over $2,500,000 and is producing heavily; Kansas more than $2,500,000 and is still turning out ore; Bates vein more than $2,000,000 and is still a producer; Fisk over $2,000,000 and is still being regularly worked at a profit; Saratoga over $1,000,000 and is one of the heaviest producers in the camp.

NEW MEXICO.

Spiller & McLean are working 20 men on the Pacific Gold Company's claim, on the Pacific lode, and shipping the ore to the 10-stamp mill at Silver City.

At Carlisle the Steeple Rock Mining Company are employing 120 men on the various mines. Ninety of them are Mexicans and about thirty Americans. Ten stamps in the big mill are all ready to start, but it is not probable the mill will be started till after election.

At Mogollon the Confidence mine is the only one now running in the camp. Ninety men are employed. A large proportion of the labor is being done in development work. The development below the main adit level is showing up as well as the great ore bodies above.

Silver City *Enterprise:* The Bayard Mining and Milling Company of Central City, New Mexico, has been organized with a capitalization of $600,000, to work seven properties in the Central district, including the Texas mine. New York and Philadelphia capitalists are the organizers.

The new firm which owns the Dorsey gold properties is driving an adit level upon the Talcose mine. The owners intend to develop the property, and, if it proves as good as the surface showing indicates, a mill will be built.

ARIZONA.

Journal-Miner: At Santa Maria the Goodenough has been sold to an English company.

At the Gold Standard tunnel No. 1 has been driven in 200 feet in the vein and shows ore all the way.

Throughout Turkey creek district the hills are said to be full of prospectors.

The new 100-ton smelter furnaces for the Old Dominion Mining Company are on the way to the mines.

MEXICO.

At El Pomo, in the Alta district of Sonora, the new mill of the National Mexican Mining and Development Company has started up. It has a capacity of thirty tons daily. The product is running from $180 to $300 per ton in gold. The company owning and operating the property is a Chicago concern in which the Armours are interested.

Nogales *Oasis:* Colonel Waddell of New York, representing a syndicate headed by F. J. Lancaster of No. 2 Wall St., N. Y., has closed a deal by which there passes into their hands the Esperanza and Francisco mines, in the Magdalena district of Sonora. Reports were made by Ignacio Bonillas of Sonora and John Farish of Colorado. The properties are well developed, having over 2000 feet of shafts, tunnels, drifts and winzes, exposing, it is claimed, over 200,000 tons of ore. A 20-stamp mill will be erected. Several carloads of machinery for it are now at Nogales.

LOWER CALIFORNIA.

The *Union* says the owners of the Cedros Island mines have completed plans for putting in an immense plant on the island. G. E. M. Pratt of Chicago and J. H. Denman, representing the English investors in the new enterprise, are now in Chicago, after a visit to the mines. They left Superintendent Eames and a party of mining engineers on the island, where six weeks will be consumed in making preliminary surveys and perfecting plans for work. The company will build a 40-stamp mill by the sea shore and will put up a cable tramway to carry ore from the mines to the mill, a distance of from one to two and one-half miles. The mill will be so built that it can be doubled or trebled in capacity with no extra expense for building or foundation. If the ore can be extracted as easily as now appears probable, the mill will be increased to 100 stamps within two years. Sea water will be used for amalgamating purposes, and large condensers will provide fresh water for the boilers and for consumption by the miners, if found desirable. The company will also build or buy a gasoline schooner to ply between San Diego and the islands, to carry supplies and passengers. Altogether $150,000 will be expended by the company in establishing its plant. The process of working the ores will depend upon their character, as revealed in tests now being made. It is conceded that the ore is not free milling, and that some chemical process must be used. It will probably be cyanide. A vast quantity of ore is in sight, developed by the old company, and much of it is of high grade. Other ore which could not be handled profitably by the old company will be made to pay large returns by reduction on the ground. About 200 men will be employed when the work gets under full swing.

Lower Californian: At Agua Dulce the new 10-stamp mill of the La Fortuna Mining and Milling Company is crushing twenty-five tons of ore daily.

CANADA.

The summary of the mineral production in Canada, issued by the geological survey, shows 1895 to be the most satisfactory year as regards mining since the department began the preparation of its statistics in 1886. The figures of production for the ten years are as follows:

Year	*Production.*
1895	$22,500,000
1894	20,900,000
1893	19,250,000
1892	19,500,000
1891	20,500,000
1890	18,000,000
1889	14,500,000
1888	13,500,000
1887	12,500,000
1886	12,000,000

The value of gold production, compared with 1894, rose from $954,451 to $1,910,921; that of lead and silver from $597,441 to $1,908,599. There was also an increased production of copper and iron ore, the whole partially offset by a decline in the value of the nickel output from $2,061,000 to $1,360,000. Coal production fell off from 3,853,235 tons to 3,512,504 tons, and in value from $8,447 329 to $7,774,178, and this decrease, which is likely to be more than made up for in 1896, reduced the total value of non-metallic products from $15,921,000 to $15,875,000, not a very serious decline, it will be admitted, and which was more than compensated for by the increase in metallic products from $4,683,389 to $5,370,146.

AUSTRALIA.

Mining Standard: The following is an analysis of the results of the Croydon Quartz Crushing and G. M. Company's cyanide operations and shows cost of treating low-grade tailings at the largest works of the kind in Australia:

Duration of run (working days)	469 days
Corrected dry weight of tailings leached	37,387 tons
Weight of tailings leached per day	79.7 tons
Percentage of acid in ore	0.24 per cent
Water to remove acid per ton of ore	174 gallons
Average leaching rate (water and solution) per hour	0.93 inches
Sizing of tailings—	
Passing 40-mesh screen	90.2 per cent
Remaining on 40-mesh screen	9.8 per cent
Weight of bullion recovered	36,781.1 ounces
Weight of fine gold recovered	8,252.2 ounces
Weight of fine silver recovered	26,756.6 ounces
Cyanide consumed per ounce of bullion recovered	0.99 pounds
Zinc consumed per ounce of bullion recovered	0.26 pounds
Strength of cyanide solution	0.2 per cent
Percentage on tailings	0.08 per cent

	Gold, dwts.	*Silver, dwts.*
Assay of tailings before treatment, per ton	6.45	30.45
Assay of tailings after treatment, per ton	1.49	16.41
Extraction called for, per ton	4.96	14.04
Recovery, per ton	4.41	14.31
Recovery, per cent	68.3	46.9
Average fineness of bullion	.2243	.7275

	£	s.	d.	s.	d.
Average value of bullion, per ounce	0	19	0	65	1 2.64
Assay value of tailings, per ton	1	7	4	77	2 7.97
Recovered value of tailings, per ton	0	18	9	01	1 2.58

COST OF TREATMENT.

Pounds.	*Cost.* £	s	d.	*Lbs. per ton.*	*Cost per ton.* s.	d
Cyanide 36,495	3,824	10	5	0.97	2	0.53
Zinc 9,720	308	4	5	0.26	0	1.98
Caustic Soda 30,106	245	16	4	0.80	1	1.57
Chemicals	351	14	8	...	0	2.25
Firewood, 387¼ cords	503	8	0	....	0	3.23
Water	456	15	6	....	0	2.93
Miscellaneous stores, etc	203	8	6	....	0	1.30
Laboratory salaries	768	15	2	....	0	4.93
Management	740	0	0	....	0	4.75
Filling and discharging vats	3,096	0	0	....	1	7.87
Other labor	1,044	15	5	....	0	6.71
Royalty	2,861	4	0	....	1	6.36
Bank charges	3,065	1	8	....	1	7.67

Total cost, £17,466 14s 1d.

Total cost per ton, 9s 4 11d.

Mill process employed: Stamping over copper plates and grinding the blanketings in wheelers and berdans.

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High Speed Engines, Dynamos, Rolling-Mills, Steamships, Railroads, Saw-Mills, Cotton-Mills, Paper-Mills, Woolen-Mills, Silk-Mills, Jute-Mills, Rubber-Mills, Sugar-Mills, and all Machinery Bearings.

Gray's Harbor Commercial Co., Cosmopolis, Wash., state:
"We have never used any other than AIDION since we have carried same in stock, and further, that we have babbitted up the 'Thrust Box' on one of our steamers, where nearly every other kind of Babbitt had been used. In every case it had been unsatisfactory, but since putting in the AIDION we have had no trouble in any way whatever."

K. J. McHUGH, Successor to the Adkins Manufacturing Co.
35 NEW MONTGOMERY STREET, SAN FRANCISCO, CAL.

HORACE F. BROWN, CONSULTING ENGINEER.

Special attention given to preparing plans for the Chlorination and Bromine Processes of Treating Gold Ores.

PATENTEE { **Brown's Complete Automatic Mill Process.** **Brown's System of Mechanically Stirred Roasting, Cooling and Conveying Furnaces. Etc.**

1607-8 Manhattan Building, Chicago, Illinois.

KENDALL GOLD AND SILVER EXTRACTION CO.
THE KENDALL PROCESS is the most efficient method of using cyanide for the extraction of precious metals from their ores. Wherever this process has been adopted the result has been increased percentages of values recovered and saving of time. Material reduction in consumption of chemical has also been demonstrated with respect to several classes of ores.

All ores, without exception, amenable to cyanide treatment can be treated to better advantage by the Kendall Process. This can be accepted as an axiom.

The Kendall system of gold and silver milling comprises (1) the Extraction Process, in which the chemical solution extracts the values from ores; (2) the Recovery Process, by which the gold and silver are obtained from the solution, and (3) a modified form of plant, not indispensable, but permitting the use of unskilled labor.

Owners of mines and reduction works can obtain full information on application to
KENDALL GOLD AND SILVER EXTRACTION CO.....47 Broadway, New York City.

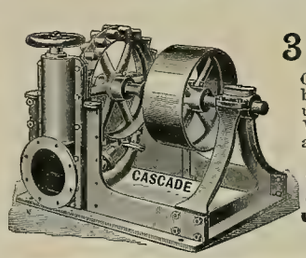
The General Gold Extracting Co., Ltd.,
PELATAN-CLERICI PROCESS.
Patented in U. S. and Other Countries. Capital, £100,000.
London Head Office.....8 Drapers Gardens.
Laboratory and Ore Testing Plant, 1530 Wynkoop St., Denver, Colo.

This process has a well-demonstrated merit in treatment of low-grade Gold and Silver Ores, especially those of a complex character, talcose and clayey combinations or slimes, which class of ore, as is well known, cannot be treated by leaching or lixiviation.

Gold and silver values, both fine and coarse particles, are by the PELATAN-CLERICI PROCESS recovered direct from ore without roasting as pure amalgam, and the precious metals are saved in the form of fine bullion without any refining costs.

F. CLERICI, Manager for U. S.

TURBINE AND CASCADE WATER WHEEL
Adapted to all Heads from
3 Feet to 2000 Feet.



Our experience of **33 YEARS** building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.

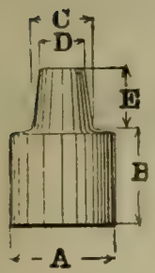
JAMES LEFFEL & CO.
SPRINGFIELD, OHIO, U. S. A.

ONE CENT Per Hour is Cheap.
That is what "WEBER" GASOLINE ENGINES COST to run per H. P. Simple, Safe, Reliable, Economical. Get Posted. *Address* **WEBER GAS & GASOLINE ENGINE CO.,** *430 S. W. Boulevard,* **Kansas City, Mo.**

RISDON IRON WORKS,

Office and Works: Cor. Beale and Howard Streets, San Francisco, Cal.

MINERS, ATTENTION!



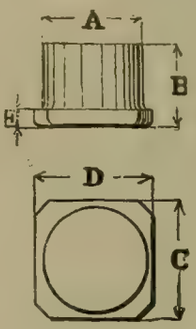
A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "

We beg to call attention to our "RISDON HAMMERED" Shoes and Dies, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "

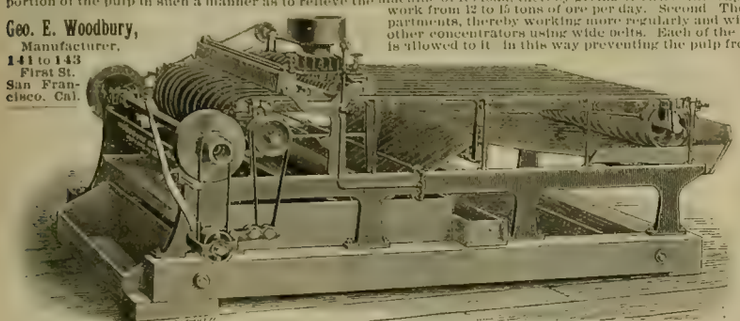
When Writing please mention the MINING AND SCIENTIFIC PRESS.

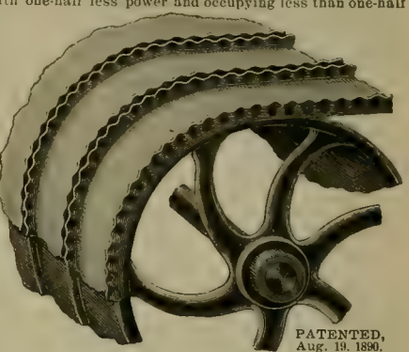
THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THIS CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of best Steel and Wrought Iron. Strong and durable. Price $575 f. o. b. Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS: First—The improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 12 to 15 tons of ore per day. Second—The machine equalizes the load by several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allowed to it. In this way preventing the pulp from running to the lower side of it, as is the case when a machine becomes out of level where wide belts are used. Third—The belts run on a perfect line, needing no adjustment to prevent their running from side to side, as in other concentrators. Fourth—The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth—The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth—The feed arrangement is perfect. Seventh—The machine is constructed of iron, with steel crank-shaft self-oiling boxes, and everything made in the most thorough manner, enabling it to run with very little attention or wear.

Geo. E. Woodbury,
Manufacturer,
141 to 143 First St.
San Francisco, Cal.





PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st prize at the World's Columbian Exposition 1893, and at the San Francisco Midwinter Fair, 1895.

THE GUTTA PERCHA AND RUBBER M'F'G CO.

30 and 32 FREMONT ST., SAN FRANCISCO.

Spadone's Concentrator Belts. Patented.

The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

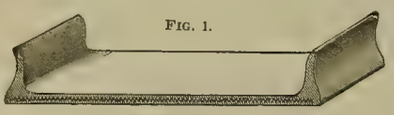


FIG. 1.

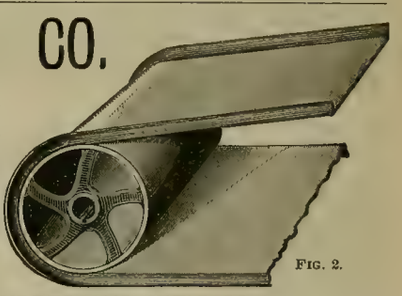


FIG. 2.

We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.

THE GUTTA PERCHA RUBBER AND M'F'G CO.
TELEPHONE, MAIN 1813.

Thomson & Boyle,

(Successors to J. F. Holbrook.)

MANUFACTURERS OF

Water Tanks, Oil Tanks, Sheet Iron Work of All Kinds.

ALSO MANUFACTURERS OF PHILLIPS SANITARY GRATE & VENTILATOR.

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W. A. WEIGELE PIPE WORKS.

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Sixty Thousand Feet of Steel Pipe Made in 1895.

SHEET STEEL WORK of all kinds.

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DEWEY & CO., Patent Solicitors,

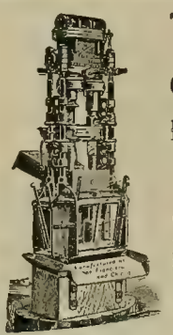
220 MARKET ST., SAN FRANCISCO.

Mining Pipe!

STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.

WRITE FOR CIRCULARS OF
The Truax Pat. Automatic **ORE CARS.**

SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,
SACRAMENTO, CAL.



Tremain Steam Ore Stamp.

COMPLETE FREE-MILLING PLANT FOR $1,000.

Consisting of One TREMAIN STEAM STAMP, with Automatic Feed, capacity from 8 to 12 Tons a Day; One Upright Boiler; 20 Feet Electro Silver Plate, and all Pipes and Fittings necessary to connect Boiler and Mill.

Total Weight, About 5000 Pounds.

It requires no belting, shafting, pulleys or building.

Can be transmitted in section or whole. Well adapted to localities difficult of access. Weight, 3000 pounds.

Its practicability was fully demonstrated by its enormous sales of 1895, which exceeded those of two former years, and is now in successful operation in Africa, Alaska, Mexico, Colorado, South America, California, Canada, Montana, Oregon, Central America, Arizona, Dakota, New Mexico, Wyoming, etc.

SEND FOR CATALOGUE.

PROSPECTIVE MINING AND MACHINERY CO.,
127 FIRST STREET, SAN FRANCISCO, CAL.

QUICKSILVER!

—FOR SALE BY—

The Eureka Company,
OF SAN FRANCISCO.

ROOM 1, - 426 CALIFORNIA STREET,
SAN FRANCISCO.

TUBBS CORDAGE CO.

(A CORPORATION.)

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc. ☞ Extra sizes and lengths made to order on short notice

611 and 613 FRONT ST., San Francisco, Cal.

Coast Industrial Notes.

—The Oregon Improvement Company will build 100 new cars at its shops at Seattle, Wash.

—Trail, B. C., is inaugurating a water system to supply from a 3,000,000-gallon reservoir on Gorge gulch.

—The city government of Mexico wants bids for pumping machinery to be used on the city's sewers. Bids must be in by November 14, '96.

—Lately was struck a third stratum of oil in the Summerland belt in Santa Barbara county, and it is said that a number of new wells will be sunk.

—The Power Development Company in Kern county has let contracts for the construction of four 44-inch wheels at its powerhouse with a capacity of 1500-horse power.

—A shipment of twenty tons of kaolin from the beds near Ashland, Oregon, has lately been made to a pottery firm in Portland. There are extensive deposits, and it is claimed to be of good quality.

—The tie contractors for the Union Pacific are arranging to bring the largest drive of ties down Medicine Bow and Rock rivers ever attempted. The number to be run down Medicine Bow is 260,000 and down Rock river 150,000.

—The first Japanese steamer, the Miike Maru, of the Nipon Yusen Kabuchiki, arrived at Seattle last Monday. The company is under contract to operate a line of steamers for a year to connect with the Great Northern Railroad.

—An explosion at the California Powder Works at Pinole, Contra Costa county, last Tuesday, caused the death of four white men and eight Chinamen. The loss to the company is estimated at $25,000. The company expects to be running again in two weeks.

—The Sierra-Pacific Railroad Company has organized to build a narrow-gauge road from Stockton to Jackson, Amador county. In addition to the main line, it is proposed to build branches to San Andreas, Campo Seco and Plymouth Rock mines in Calaveras county. The main line is to be fifty miles in length and the branches ten miles. The capital stock is $10,000,000, of which $60,000 has been subscribed and $6000 paid up. The directors are B. F. Langford, B. W. Moore, George A. Brown Jr., D. A. Robertson, P. A. Buell and M. J. Gardner, all of San Joaquin county, and W. A. Shippee of Avon, Butte county.

—B. Taylor of Iron county, southwestern Utah, is in Los Angeles perfecting a scheme to build a railroad from Iron county, Utah, to that city. The proposed line would connect with the Union Pacific or Utah Central and Denver and Rio Grande roads at Cedar City. He says it will cross the county to Desert Springs and thence by Bullionville and Pioche, Nev., to Clover Valley, then down the Virgin river to the Colorado river, to Good Springs, to Ivanpah, to Ludlow on the Southern Pacific, through the Morongo Pass to Banning and thence on to Los Angeles. He talks of erecting furnaces at Cedar City and manufacturing rails and iron at that point. The road would cost $10,000,000. A company—the Utah Iron and Coal Company—has been formed in Utah and stock for $5,000,000 will be issued. The money for the road and developing of the iron and coal mines Taylor says he has secured in England. He has a letter from his agent there saying the money has been secured and is ready as soon as the experts have examined the mines and gone over the proposed line.

Recent California Mining Incorporations.

Mariposa Gold Company, S. F.; W. Meyerhofer, G. F. Lyon, E. Ewald, G. W. Allen; capital stock, $100,000; $50,000 subscribed.

Potazuba Mining Company, Sutter Creek, Cal.; T. T. Lane, Angel's Camp; J. Nichols, Jackson; E. S. Barney, Drytown; E. C. Voorhies, Sutter Creek; W. J. McGee, Alameda; capital stock, $100,000; $25 subscribed.

White Cloud gravel mine, Oakland, Cal.; hydraulic mining; capital stock, $100,000; paid in, $20,000; W. B. and D. S. Edwards, O. S. Sherman, J. and A. Mitchell, W. and J. P. Beckwith, J. T. Cole, all of Oakland.

Wonder Mining and Milling Company, Alameda; J. C., H. W. and F. Linderman, J. M. Haskell, J. N. Barstow, all of Alameda.

Obituary.

DR. NOBLE MARTIN of Dutch Flat, Placer county, member of the State Senate from Placer and El Dorado, died last Monday in Berkeley, aged 76 years. Dr. Martin came to California in 1852, engaged for a number of years in mining and then resumed the practice of his profession. His sterling character and virile ability gave him a large influence which has often been used in the Legislature in behalf of mining interests. No man was more universally respected in the mountains among the miners.

Commercial Paragraph.

THE Abner Doble Co. has this week moved into its large new building, corner Howard and Fremont streets. This company is now contracting for electric power and steam railway plants on an extensive scale.

Recently Declared Mining Dividends.

Deadwood-Terra, South Dakota, $100,000, payable Aug. 20th; total to date, $1,240,000.

Swansea, Utah, $4713.75, payable Sept. 15th.

THE commercial micas are: Muscovite (white mica), phlogopite (amber mica) and biotite (black mica). Muscovite is used principally for stove panels. For this purpose it must be clear and free from spots. The best muscovite is ruby red in color when in blocks. The white color comes next in value. The sizes of the sheets most desired for commercial purposes are one and one-half by two inches up to eight by ten inches. Phlogopite is used chiefly for electrical purposes, and is free from wrinkles or crevices. It splits easily and is very flexible, stands a very high temperature without disintegrating; dark spots lessen its value. Waste mica is ground and used as a lubricant for heavy bearings; in certain insulating compounds, for decorating wall papers and as a fertilizer.

Personal.

CURTIS W. LINDLEY has returned from a business visit to Great Britain.

MR. F. EDELSTEN, editor and proprietor of the Los Angeles *Mining Journal*, is in this city on his wedding trip.

A. B. KNIGHT, a mining engineer of Butte, Montana, is here to examine some gold mining properties in the northern part of the State. He is said to represent a moneyed syndicate.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUGUST 25, 1896.

566,554.—PLUMB LEVEL—J. Appleton, Modesto, Cal.
566,659.—PLOWS—G. C. Christenson, Newberg, Or.
566,568.—BICYCLE—C. B. Fields, Merced, Cal
566,303.—ROTARY ENGINE—Fisk & Camp, Sedro, Wash.
566,395.—STEAM GENERATOR—A. Heberer, Alameda, Cal.
566,369.—LAST—A. M. Leighton, Everett, Wash.
566,348.—THILL SUPPORT.—E. J. Spencer, San Diego, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GRAIN DRILL ATTACHMENT FOR GANG PLOWS. A. J. Malsbary, Reedley, Cal. No. 553,926. Dated Feb. 4, 1896. This invention relates to an improved seeder attachment for gang plows. It consists of a triangular drill frame having the front end loosely supported upon the plow beam; a swivel wheel supporting one side of the rear of said frame; a loose connection between the other side of the rear end of the frame and the plow frame; shoes or runners traveling upon the ground in front of the grain drill tubes so as to form channels to receive the grain; a transverse bar extending beneath the drill frame; curved springs connecting the front of each runner with the bar; vertical hangers having the lower ends attached to the bar, the upper ends loosely connected with the drill frame; clevices slidably fitted upon the hangers; rocker arms and lever with intermediate connections whereby said clevices are raised or lowered upon the hangers, and chains extending forwardly upon the clevices, having the front end attached to the plow frame so as to impart motion to the grain drill and to regulate the depth of travel of the shoes or runners.

Every Inventor Wants a Good Patent

Or none at all. To secure the best patents Inventors have only to address DEWEY & Co., Pioneer Patent Agents, No. 220 Market St., San Francisco.

There are many good reasons why Pacific Coast Inventors should patronize this Home Agency.

It is the ablest, largest, best, most convenient, economical and speedy for all Pacific Coast patrons.

It is the oldest on this side of the American continent, most experienced, and in every way reliable.

Conducted from 1863 by its present owners (A. T. Dewey, W. B. Ewer and Geo. H. Strong), this agency has the best knowledge of patents already issued and of the state of the arts in all lines of inventions most common on this coast.

Patents secured in the United States, Canada, Mexico, all British colonies and provinces, England and other civilized countries throughout the globe.

Caveats filed, assignments duly prepared, examinations made, and a general Patent Agency business conducted.

Established and successfully and popularly conducted for nearly thirty years, our patrons number many thousands, to whom we refer with confidence, as men of influence and reliability. Old and new inventors are cordially offered the complimentary use of our library and free advice, etc. No other agency can afford Pacific States inventors half the advantages possessed by this old, well-tried and experienced firm.

THE HARRINGTON & KING PERFORATING CO. CHICAGO.

METALS PERFORATED AS REQUIRED FOR

MINING SCREENS OF ALL KINDS

AND FOR USE IN

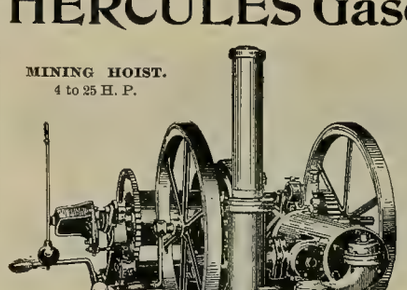
Milling and Mining Machinery	Stone, Coal and Ore Screens
Reduction and Concentrating Works	Stamp Battery Screens
Woolen, Cotton, Paper and Pulp Mills	Brick and Tile Works, Filters
Rice, Flour and Cottonseed Oil Mills	Spark Arresters, Gas and Water Works
Sugar and Malt Houses	Oil, Gas and Vapor Stoves
Distilleries, Filter Presses	Coffee Machinery, etc., etc.

Standard Sizes Perforated Tin and Brass Always in Stock.

Main Office and Works: 209 to 211 North Union Street, Chicago, Ill., U.S.A.
Eastern Office: No. 284 Pearl Street, New York

HERCULES Gasoline Engines.

MINING HOIST.
4 to 25 H. P.



Started Instantly.
Tube or Electric Igniter.
Clean. Safe. Sure.

HOISTING Engines .
PUMPING Engines .
MARINE Engines .
STATIONARY Engines.

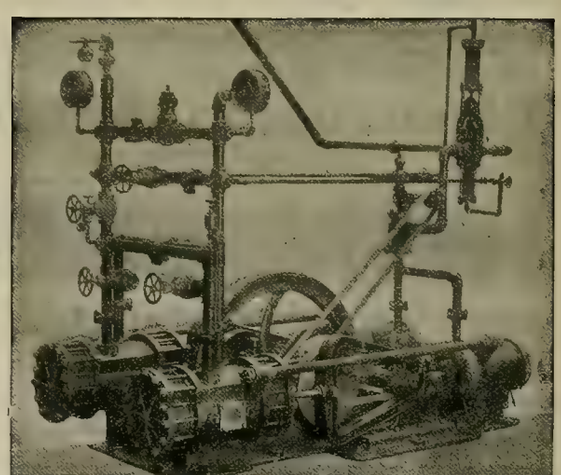
They Are the Best To Buy.
Cheapest To Operate.
Most Satisfactory.

MINE OWNERS

Cannot afford to use Hoists that are unreliable. The HERCULES HOIST is Absolutely Safe. Always Ready. One man operates Engine and Hoist. Satisfaction guaranteed or your money back.

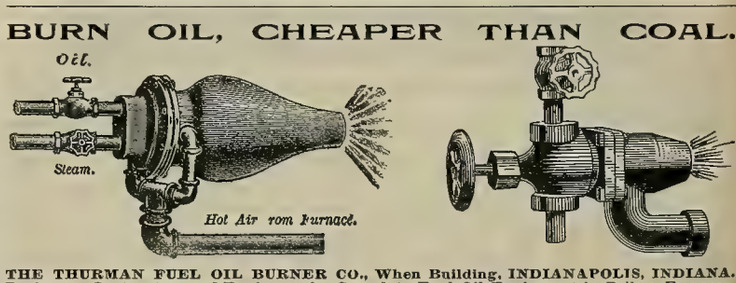
Hercules Gas Engine Works.
Gas, Oil and Gasoline Engines, 1 to 200-horse power.
Office, 405 and 407 Sansome Street, - - - - San Francisco, Cal.
Write for Catalogue.

DOUBLE PIPE AIR COMPRESSOR.



This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to PNEUMATIC POWER CO., at 306 Pine St., San Francisco, Cal. We could save you money, though, in cost of foundations, as our Compressors are half the size of other makes.

BURN OIL, CHEAPER THAN COAL.



THE THURMAN FUEL OIL BURNER CO., When Building, INDIANAPOLIS, INDIANA. Designers, Contractors and Engineers for Complete Fuel Oil Equipment for Boilers, Furnaces, Ovens, Brick Kilns, Forges, Driers, Etc. Acknowledged the Best. Absolutely Smokeless. We Guarantee Our Burners To Be More Economical Than Any Other. Write For Catalogue and Prices.

Books Received.

THE department of geology of the University of California has published a bulletin on the geology of Point Sal in Santa Barbara county, a section that has been of considerable commercial interest on account of the bituminous shales worked there, and the gypsum deposits which in years past was the most important source of that mineral in the State. The work was done by Harold W. Fairbanks and is another valuable contribution on the part of the University to the geology on the coast of California.

Speaking of the extent of the bituminous shale Mr. Fairbanks says: "It has an extensive areal development in the Coast Ranges. The greatest thickness is not known. Professor Lawson estimates it at 2,000 feet at Monterey. It is probably 1,000 feet at Point Sal. There are other areas in Monterey county where it is possibly 2,000 feet, and until the whole region is better known, any conclusion reached at present is liable to need revision."

The bulletin may be purchased from the University librarian, J. C. Rowell, Berkeley, Cal., price 65 cents.

THE introduction of no other new process in mining has ever been accompanied with as much literature on the subject to help it along as the cyanide process, and there should be no excuse for any mining man to plead ignorance of it for want of good, practical data. The revival of mining has, of course, done much to give the process encouragement, and the result has been its rapid and wide adoption wherever the ores are adapted to such treatment. James Park, director of the Thames School of Mines in New Zealand, has lately published a second edition of his book, "The Cyanide Process of Gold Extraction," a comprehensive, handbook that will be of value to those interested in the subject. Its publication is timely, for there have been of late many improvements in the minor details of the process and in the appliances used. Mr. Park has made use of data from leading plants all over the mining world. Published by Champtaloup & Cooper, Auckland, N. Z., and George Robertson & Co., Melbourne.

Power From Small Mountain Streams.

There is a growing tendency among the miners and exploiters of mines in the western part of the United States to utilize as motive power streams which not so very long ago would have been considered unworthy of consideration as sources of power. Men are beginning to learn that head counts as well as volume, and that a tiny stream with several hundred feet head may be as valuable a source of power as the more imposing fall of much lower head. Then, too, the little stream needs no expensive dam or head works to confine it, but can be trapped and guided at comparatively small expense, and instead of being allowed to fall freely, it can be led into a pipe which impounds it all, and thus it can be confined and led perhaps 500 to 1000 feet down the mountain, accumulating pressure as it descends until it shoots out with full force against the buckets of the Pelton wheel, or quietly exerts its statical pressure in the chambers of a direct air compressor.

Not so very long ago the writer saw a plant being installed over 8000 feet up the Rocky mountains, and the primitive pipe-making establishment was very interesting. Rather than incur the expense of hauling the wrought pipe, a small pair of bending rolls had been procured, and these, with a portable forge, constituted the equipment. Under a frame shed by the mountain side three men were turning out length after length of riveted sheet-iron pipe, right at the place where it was to be used, and the pipe line was being constructed 500 feet up the canyon, bringing down over 200 horse power to the spot where it was to be utilized. The operations seemed somewhat primitive at first sight, but the expense account of the establishment was a minimum, and when the cost of burro train and the railway freight, and the profits of several middlemen were taken into account, the miners were probably ahead in the long run.—From Cassier's Magazine for September.

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MERCUR.
UTAH'S NEW EL DORADO.
Wonderful Development of the Camp Floyd Mining District.

The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1890 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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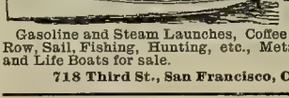
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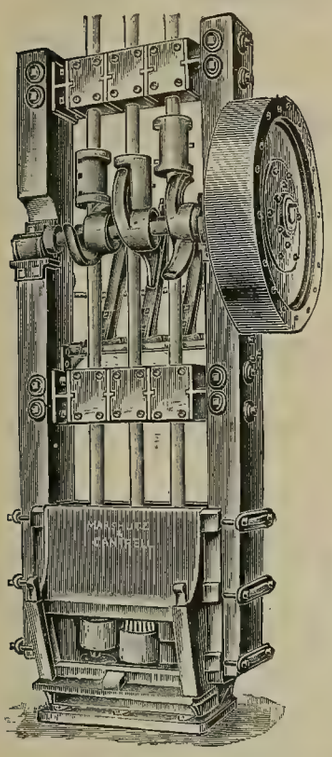

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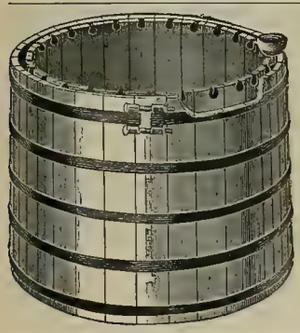

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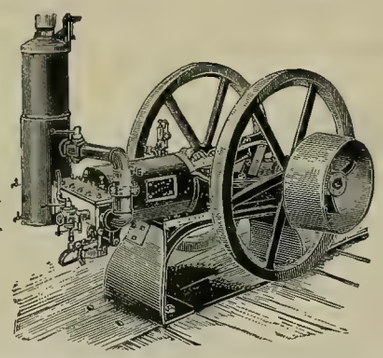

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Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c.	65

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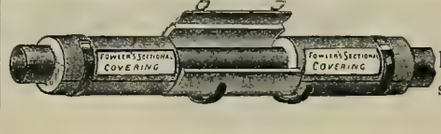

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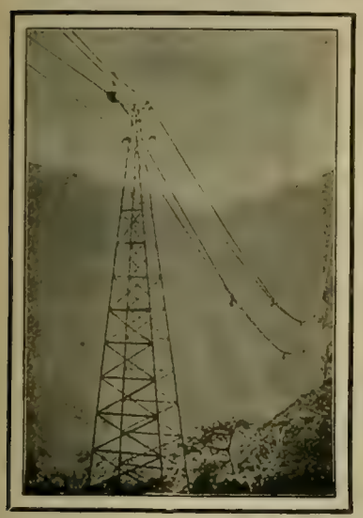

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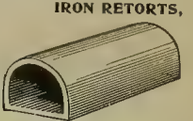

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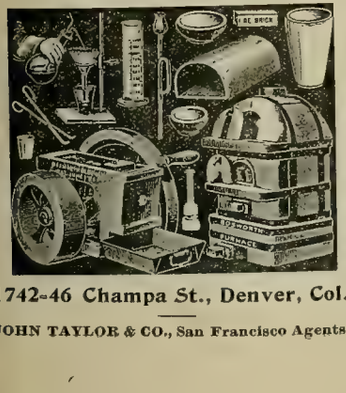

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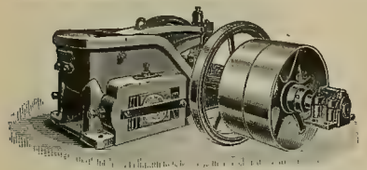

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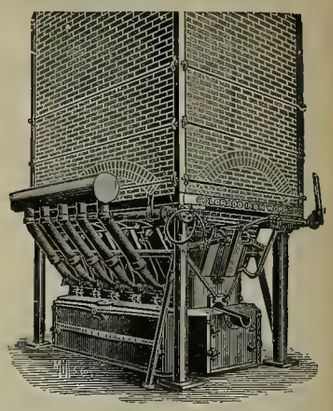

Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

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Capital paid in.....$2,700,000.

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GOLD, SILVER, LEAD AND COPPER ORES,

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We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Moreing & Neal's Code and Bedford McNeill's Code.

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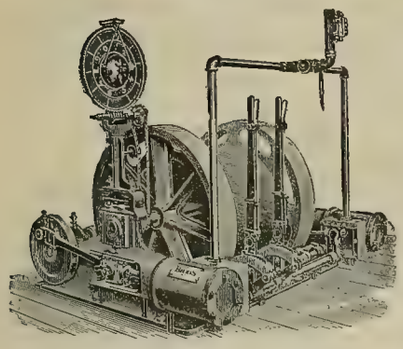

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Patent Friction Hoisting ENGINES,

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General Mining Machinery and Supplies.

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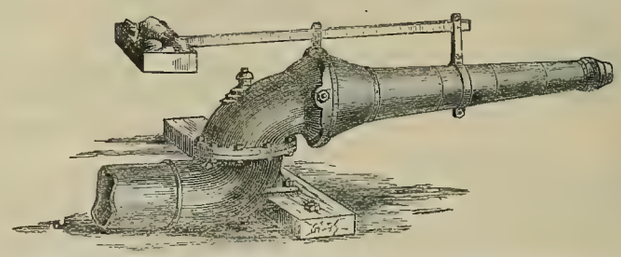

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Ores tested and amalgamation and concentration mills built to fit the ore and guaranteed to save what we say. Coal Mine equipments, Screens, Jigs, Tramways, Arastors, Chilian Mills, Ore Sacks, etc. Cornish Rolls, 12x20, weight 6,000 lbs., price $350; Feeders, Bumping Tables; Blake Crushers, 7x10, weight 8,100 lbs, only $250. Our 100 page illustrated catalogue FREE.

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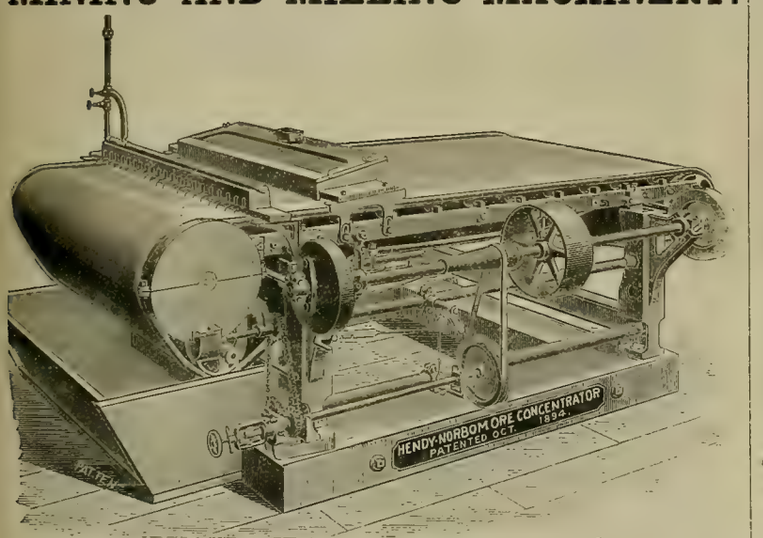

HENDY - NORBOM ORE CONCENTRATOR.

Office of ORLEANS MINING COMPANY, GRASS VALLEY, CAL., Dec. 12, 1895.

Mr. John O. Norbom, San Francisco, Cal.—DEAR SIR: Replying to your inquiry regarding the working of your Concentrator, I take pleasure in stating that the machine is doing excellent work. The curve springs give the machine a very gentle motion, which makes it mechanically perfect. We are saving our sulphurets very clean and lose a trace only in the tailings. The machine takes pulp from five stamps, handling about nine tons per twenty-four hours with ease. Our ore carries from 3½ to 5 per cent of sulphurets. The latest improved belt gives good satisfaction; it has now run about five months. I expect it will last about fifteen, which speaks well for canvas belts. As for little attention and easy working, I can recommend it to any person as being the best machine I have ever used. Wishing you success, I remain, yours truly, [SIGNED] C. A. BROCKINGTON, Superintendent.

Office of FEDERAL LOAN MINING COMPANY, NEVADA CITY, CAL., Dec. 10, 1895.

Mr. John O. Norbom, San Francisco, Cal.—DEAR SIR: Your Concentrator, which has been in use in our mill for the last six months, is still doing excellent work. At present we are running the pulp of ten stamps on one machine, without seeming to be overloaded. I can recommend the machine to do all and more than you claimed for it. Yours truly, [SIGNED] J. VINCENT, Superintendent.

STAMP MILLS!

Triumph Concentrators,
Hendy-Norbom Concentrators,
Rock Breakers,
Hydraulic Mining Machinery,
Challenge Ore Feeders,
Steam Engines and Boilers,
Hoisting and Pumping Machinery,
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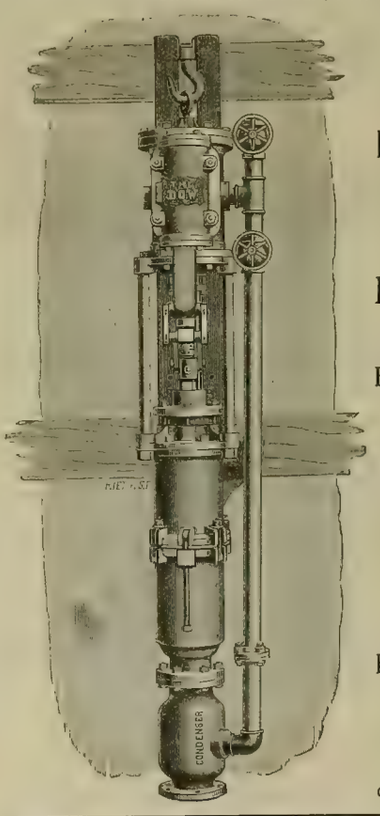
Dow's Improved Steam Pumps,

SINGLE OR DUPLEX, FOR EVERY POSSIBLE DUTY.



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Hoskins' Patent Hydro-Carbon Blow-Pipe and Assay Furnaces.

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QUARTZ SCREENS

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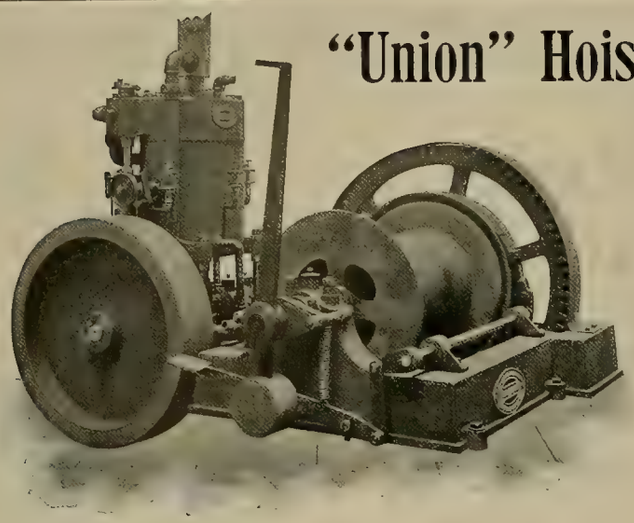

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TEN YEARS' EXPERIENCE.

About Two Thousand Engines in Use.

Started instantly. Compact, strong, simple, efficient, economical. Perfectly governed, so that oil is used only in proportion to the work done. No expense when idle.

Particularly Adapted to Mining and Ship and Wharf Use.

SEND FOR CATALOGUE AND PRICES.

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Mining Machinery.

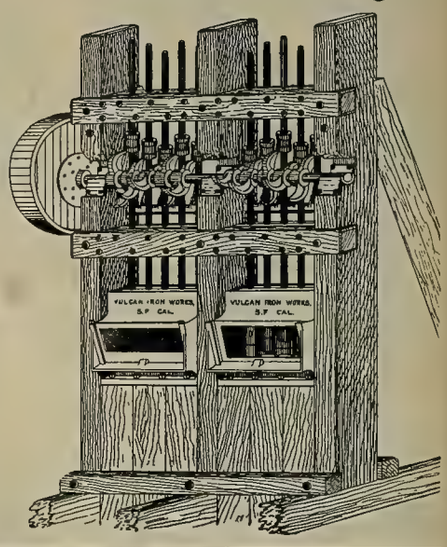
Stamp Mills

Of the Latest Improved Design for

Gold Milling.

VULCAN WIRE ROPEWAYS

For Conveying Ore, Etc.



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INSULATED WIRE

EXCEEDS that of any other manufacturer in the United States, and Includes Everything in the Electrical Line. . . . . .

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A SUPERIOR ARTICLE AT A SMALL COST.

250 Square Feet, with Nails and Paint Complete.....$4.00

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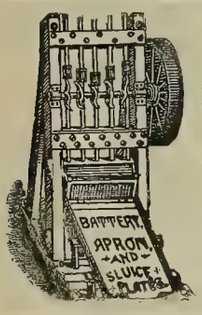

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Silver Plated Copper Amalgam Plates

For Saving Gold.

GOLD REMOVED FROM OLD PLATES AND REPLATED. Old Plates bought. Get our Reduced Rates. Five thousand orders filled. Twenty-five Medals Awarded.

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CHROME CAST STEEL

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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Special attention given to the purchase of Mine and Mill Supplies.

Stamp Cam.

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MANHATTAN RUBBER BELTING, PACKING AND HOSE.
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS.
LIGHT STEEL RAIL.

WHY THE SPRINGER CONCENTRATOR IS THE BEST.

It will do more and cleaner work than any Rubber belt machine.
It weighs only one-half as much as some of the other six-foot Concentrators.
Is the most simple in its construction of any machine in the market, and only one-third as many pieces in it as in some of the others. Was invented by an old miner of forty years' experience handling every known concentrator on the market.
Should any piece need repairing, it can be removed without disturbing any other part of the machine.
Can be set up by any inexperienced miner.
Its distributor is perfection itself, distributing the pulp evenly over the entire surface of the belt.
Grade of shaking frame can be changed while the machine is running at full speed.
It is the strongest, lightest running and most inexpensive to keep in repair of any.
Will save more of the fine slimes than any other machine.
Is cheaper than any other six-foot machine, costing only $350.00 f. o. b. cars or boat, San Francisco.
Will handle the pulp from five stamps better than any other Concentrator.
Has adjustable eccentrics, and any length of stroke can be had, thereby giving different speeds per minute.
The belt is very durable, being made of No. 3 Canvas, woven especially for the Springer Concentrator.
This machine requires so little attention that one man will easily attend to a dozen of them.
It has a solid rubber flange, which no other canvas belt has.
Wear and tear upon this machine is not one-third as much as upon some of the other Concentrators.

SAN FRANCISCO, May 27, 1896.

I. S. Van Winkle & Co., 413 Market St.

DEAR SIRS:—In a letter just received from our Superintendent, Mr. Trowbridge, he says, referring to your Concentrator: "The new Springer Concentrator is fulfilling every expectation. A few minor points may be improved upon, but in its main features it is almost perfect. I shall write more fully after further work."

Yours very truly, W. H. PAYSON,
Secretary Bald Eagle Mining Co.

Extract from Letter of W. S. Trowbridge, Superintendent Bald Eagle Mining Co. June 20, 1896.

"We work twenty tons of ore per day and size out all coarse portion after it has been worked over two other machines, and run all the slimes and finer portions over your machine. I think it would easily handle twice the quantity. It is certainly doing splendid work now, in a difficult place. I believe the belt will wear indefinitely."

July 12, 1896.

Ship us by steamer another six-foot Canvas Belt Springer Ore Concentrator and have the new Rubber Flange attachment, and put a rawhide belt on wheel. Yours truly, W. H. PAYSON,
Secretary Bald Eagle Mining Co.

MINING, IRON AND WOODWORKING
MACHINERY AND SUPPLIES
INGERSOLL-SERGEANT PISTON INLET AIR COMPRESSORS AND ROCK DRILLS
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SILVER-PLATED AMALGAMATED PLATES
For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

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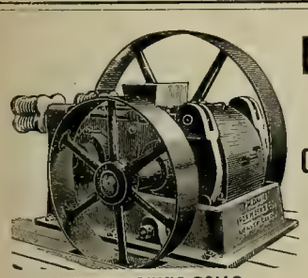
—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.



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Complete Plants for Ore Treatment

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MINE BELL SIGNALS.

Adopted, Used and In Force in Accordance with State Law.

FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 3, 1896.

Merchandise brokers state that there is a good demand, better than at this time in 1895, for about all lines except chemicals and leather. For groceries the consumption call is exceptionally good, which substantiates assertions made that there has been quite an influx of people, particularly in the mining regions. Iron workers and machinery manufacturers state that orders hold up remarkably well, and notwithstanding the presidential election there is quite a number of orders seeking to be placed. Under close competition here and with the East, bids have to be made low down.

There continues to be a good inquiry for gold mining properties. Several mining experts from other States have been here in the interest of buyers. One or two of them do not look so much at the price asked as to the mine. If the property is deemed to be worth several hundred thousand dollars they would not hesitate in securing it or else getting a bond for a reasonable length of time so as to report. This is encouraging and gives color to the opinion that the gold mining industry in California will continue to forge ahead for some time to come.

The local money while working close is not so close as three weeks ago when there were such heavy withdrawals of gold from banks for hoarding. It is estimated that several million dollars were withdrawn which compelled the banks to import gold from the East. Now they have a large supply and are in position to meet any and all demands. Several corporations that employ a large number of hands pay in standard silver which is quite a convenience, for at times it is hard to get silver dollars in exchange for gold. Merchants say that remittances from the retail trade is good —much better than at this time last year. These payments put the mercantile community in good financial position. It is said that outstanding accounts have been reduced to small amounts, considerably less than usually obtains at this season of the year. At the East the money markets continue to show a gradual, growing ease. The heavy imports of gold from Europe have had a favorable influence. Considerable foreign money is seeking a market at New York for 60 and 90 days' paper.

New York Silver Prices.

NEW YORK, Sept. 3.—Following are the closing prices for the week:

	—Silver in— London.	N. Y.
Friday	30⅝	66¼
Saturday	30⅝	66¼
Monday	30 11-16	66⅜
Tuesday	30 11-16	66⅜
Wednesday	30 11-16	66⅜
Thursday	30⅝	66¼

	Copper.	Lead.	Iron.	Tin.
Friday	10 62½	2 65	10 25@12 50	13 30
Saturday	10 65	2 65	10 25@12 50	13 30
Monday	10 65	2 70	10 15@12 50	13 25
Tuesday	10 65	2 70	10 15@12 50	13 25
Wednesday	10 65	2 70	10 15@12 50	13 25

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	Par
New York Telegraphic Transfer	Par
London Bankers' 60 days	$486
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	66¼
Mexican Dollars	51½@52½c

Eastern exchanges are nominal.

SILVER.—The market has ruled dull at easy prices throughout the week. There is a very light inquiry here either for export or speculative purposes. The Eastern markets are reported quiet. It is stated that very large quantities of bullion have been sold chiefly for export by holders in want of ready money. These sales account for the low prices abroad. With the selling pressure relaxed, the markets ought to do better on a legitimate demand.

MEXICAN DOLLARS.—There is a very light call and as the supply is liberal the price has receded. The market closes weak at the lower quotations.

COPPER.—In our market the trading is confined largely to jobbing lots. The East reports dull markets, with buyers favored by sellers. The home demand is still light, with no improvement looked for until well into October. The demand for export is well sustained. European advices are confirmatory of a liberal demand from manufacturers and shipbuilders. This call steadily decreases the stock in hand, both in England and on the Continent.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The market is essentially unchanged.

Domestic trade, per flask	36 50

For export quotations are nominal, but less than for home.

LEAD.—The market is still lower for pigs both at the East and abroad. The stock in this country and Europe is exceptionally heavy while the production is not decreasing.

Our market is quoted as follows:

Pig	—	@	3 60
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is a slightly better jobbing demand.

Drop, sizes smaller than B, per bag of 25 lbs			$1 20
Drop, B and larger sizes,	"	"	1 45
Buck, Balls and Chilled, do.	"	"	1 45

TIN.—The call for pig on this coast is light. At the East there has been a slightly freer movement which has strengthened prices for pig.

The market is quoted as follows in jobbing lots:

Pig, per lb	14
Plate, I C coke, heavy, per box	$4 10@ —
" " " light, "	4 00@ —

ANTIMONY.—The demand is fair, with the market steady at 7¾@8⅛c in a jobbing way. New York mail advices quote 7⅜@7½c for Cookson's, 6⅝c for Hallett's and 6½c for Japanese, from store.

BORAX.—There is a continued free shipping movement.

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	5¼
Concentrated, "	5⅝

POWDER.—The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

IRON.—Brokers state that the consumption is exceptionally good for the season. The East reports the markets somewhat unsettled, with some cutting being done. The consumption is increasing.

Our market is quoted as follows:

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 50
Gartsherrie	21 50	23 50

Bolt	¾ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing	20

COAL.—Imports for the eight months ending with August aggregate 820,200 tons in 1896 and 868,500 tons in 1895. The market for Australian, shipment and on the way, is lower; but English is higher, owing to an advance in freights to load.

SPOT FROM YARD—PER TON.

Wellington	$7 50	@	8 00
Greta	6 00	@	6 50
Nanaimo	6 50	@	7 00
Gilman	5 50	@	6 00
Seattle	5 00	@	5 50
Coos Bay	— —	@	4 50
Cannel	— —	@	8 50
Egg, hard	— —	@	11 50
Wallsend	— —	@	7 00
Scotch Splint	— —	@	7 50
Brymbo	— —	@	7 50

TO ARRIVE—CARGO LOTS.

Australian	5 50		
Liverpool Steam	6 25		
Scotch Splint	— —		
Cardiff	6 25		
Lehigh Lump	9 00		
Cumberland	13 00		
Egg, hard	10 00		
West Hartley	6 50		

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—The demand is fair for home and good for export.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is barely steady.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, Sept. 3, 1896.

The market has exhibited more strength with quite an advance in the Gold Hill shares under the lead of Confidence and Challenge. What caused the upmove seems to be a mystery, but as usual, the street is busy circulating all kinds of reports as to why they advanced. The most plausible are: More men to be put to work for election purposes, more favorable formation in the west cross drift and the other to collect assessments knowing that the public pays them when the market advances. Those in position to be informed have no faith in the upmove of the Gold Hill shares. They state that very little ore will be shown up this year but quite a number of assessments will show up. They also say that more men put to work more money will be required to meet expenses. If their views are correct then holders of the shares will have only themselves to blame for not selling at an advance when given an opportunity. These remarks are as applicable to shares in the other groups as to the Gold Hill. The public is given too much to rainbow chasing when dealing in shares and, like boys who try to get to the end of the rainbow for a pot of gold, they get experience, but the manipulators get out with the coin. The market acts as if it will go to higher figures, yet dealers must get the idea that it will run away for whatever is coming in the near future is purely and simple a deal based on a little ore and a good deal of talk, yet the public will be given an opportunity to get out at the advance, but 16 to 1 the large majority will buy and not sell.

Two assessments were levied the past week. Report has it that the Ophir and Challenge companies will levy assessments soon, which will be followed by others. Even Con. Virginia is expected to come in for one within the next six weeks.

The market for shares of the Bodie mines held fairly steady up to Wednesday, when Bodie sold for more money. The advance is due to encouraging news from the mines.

From the Comstock mines the news is of an unimportant character; everything seems to point to time. In Alta they are still sinking a winze in the Keystone ledge, without any change reported. Overman is raising a few tons of ore, but no mention is made of having found rich ore. Seg. Belcher and Belcher are raising ore, the former a little over 20 tons and the latter a little over 60 tons. The ore is of fair grade. In Crown Point no work is reported, but the official letter states that the last of the low-grade gold has been shipped to the mill. Since the letter was sent off it is said that more men have been put to work. About 179 tons of ore has been milled by Belcher, but the battery assay is not given. There is nothing new from Yellow Jacket. Late advices from Confidence are essentially unchanged. They are raising a few tons of fair grade ore. They fail to state the nature of the work going on in that mine, and also in Challenge. Reports received from Virginia City are to the effect that more men are to be put to work on the Gold Hill mines. It is also stated that the joint Confidence, Challenge and Con. Imperial crossdrift is changing for the better. In Con. Imperial both crossdrift No. 3 and the Challenge, Confidence and Con. Imperial crossdrift are being pushed slowly ahead. In Alpha they continue to fool around the 500-foot level. Work is still being done in the long west crossdrift in Bullion. In Potosi they are working in the 450-level without any particular change reported. Advices from Chollar continue to report the raising of ore while prosecuting exploiting work. From Hale & Norcross nothing new comes to hand. The work continues of an exploiting character. Official letters from Savage are aggravatingly long, but without information of an encouraging character. From Gould & Curry and Best & Belcher our advices continue to report work to the east from the Bonner shaft. The last letter from Con. Virginia indicates that the ore on the 1750-foot level will give out before long. They are milling that already taken out. Public interest centers on the work under way to the east from the 1650-foot level, which will soon be in interesting ground. On the 1000-foot level work is still being done towards the west. Some seepage of water is coming in, which is more favorable. The work in Ophir, Mexican, Union, Sierra Nevada, Utah and Andes is on the same levels heretofore reported, with no material change in the formation.

From the Brunswick lode our advices continue to note active work by the different companies, with no feature of special interest to note. In Occidental work is continued on the levels heretofore reported. They are still sinking from the 750-foot level. The mill was to have started up this week. In Chollar they are drifting south on the 300-foot level, but work in the chute has been temporarily stopped. They are also drifting south on the 200-foot level. In Hale & Norcross the 400-foot level station is completed, and drifting south will be commenced as soon as possible, probably by the 10th or the 15th of the month. When started, the work will be pushed with the utmost speed. In Savage they have taken up the north drift on the Hale & Norcross 300-foot level.

The Con. Virginia, Best & Belcher and Gould & Curry shaft No. 2 is being sunk slowly. In Gould & Curry quite active work is being done, with no change to report since last week's review.

From the Bodie district the news grows in interest. These mines appear to be a vein on business principles, and therefore it is quite refreshing to read the superintendents' letters. Some narrow streaks of high-grade ore are being encountered in Bulwer, Bodie and Standard. It looks as if the mines will soon begin to pay more than expenses. Some Standard and Bodie ore has been milled.

The following illustrates the changes of the week:

Mines.	Aug. 27.	Sept. 3.
Alpha	....	17
Alta Consolidated	10	12
Andes	31	31
Belcher	28	30
Best & Belcher	1 05	1 10
Bodie	66	75
Bullion	08	....
Challenge	....	61
Chollar	2 05	2 20
Confidence	....	1 65
Consolidated California and Virginia	1 85	1 85
Consolidated New York	....	....
Crown Point	....	33
Exchequer	....	....
Gould & Curry	....	58
Hale & Norcross	1 35	1 50
Justice	....	....
Mexican	53	60
Ophir	....	1 00
Overman	13	....
Potosi	90	96
Savage	50	58
Sierra Nevada	43	48
Union	33	....
Utah	07	....
Yellow Jacket	....	38

San Francisco Stock Board Sales.

SAN FRANCISCO, September 3, 1896

9:30 A. M. SESSION.

400 Alpha	17	200 Confidence	1 60
100 Alta	12	200 Crown Point	31
200 Belcher	29	100 Mexican	55
300 Best & Belcher	1 10	500 Potosi	90
150 Bodie	75	200 Savage	55
100 Challenge	59	50 Seg Belcher	11
50 Chollar	2 15	100 Yellow Jacket	37

SECOND SESSION—2:30 P. M.

100 Ophir	1 00	100 Confidence	1 65
800 Mexican	60	800 Sierra Nevada	48
200 Gould & Curry	58	200 Union	42
100 Con Cal & Va	1 85	500 Occidental	62
450 Chollar	2 20	350 Andes	31
300 Potosi	96	200 Mono	25
300 H. & N	1 50	400 Bodie	74
400 Crown Point	33	100 Challenge	61
400 Yellow Jacket	38	100 Savage	58
250 Belcher	30		

SOME TIME AGO a queer story came from one of the English coal mining districts, where some of the mines had been drowned for years, and the many attempts to pump them dry had been ineffectual. After many thousand pounds had been spent in pumping without doing any good, it was found that the water raised by the pumps had been allowed to find its way back into the mines through old shafts, crevices and other avenues. It made both amusing and instructive reading, but if one simply changed the names, the whole account sounded not much different from one hundred and one things within the experience of undoubtedly a great many engineers. Work is performed over and over again to no purpose, just because care is not taken to see that every stroke tells.—From Cassier's Magazine for September.

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied, Deling't and Sale.	Secretary.
Alpha Con M & M Co, Nev	17	10c	Aug 3..Sept 7..Sept 29	C E Elliott, 309 Montgomery
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24..Sept 24..Oct 24	E D Farish, 632 Market
Anita G M Co, Cal	10	7c	July 20..Aug 25..Sept 15	L F Reichling, 404 Montgomery
Bay State M & D Co, Cal	33	3c	Aug 21..Sept 30..Oct 20	F E Luty, 330 Pine
Bullion Mining Co, Nev	42	10c	Aug 14..Sept 15..Oct 8	R R Grayson, 331 Pine
Belcher S M Co, Nev	53	25c	Aug 5..Sept 10..Sept 30	C L Perkins, Mills Building
Confidence S M Co, Nev	27	30c	July 30..Sept 3..Sept 24	A S Groth, 414 California
Con Imperial M Co, Nev	37	1c	July 24..Aug 27..Sept 23	C L McCoy, Mills Building
Crown Point M Co, Nev	68	20c	Aug 18..Sept 23..Oct 13	J Newlands, Mills Building
Gold Bar Con M Co, Cal	4	2c	July 13..Aug 20..Sept 21	E C Godfrey, Crocker Bldg
Gould & Curry S M Co, Nev	79	15c	Sept 1..Oct 5..Oct 27	A K Durbrow, 309 Montgomery
Jamison M Co, Cal	8	5c	July 6..Sept 7..Sept 28	Sam W Cheyney, 120 Sutter
Occidental Con M Co, Nev	24	10c	Sept 2..Oct 8..Oct 29	A K Durbrow, 309 Montgomery
Reward G M Co, Cal	1	3c	Aug 8..Sept 14..Oct 5	J Stadtfeld, 309 Montgomery
Sierra S M Co, Nev	111	25c	Aug 7..Sept 11..Oct 1	E L Parker, 309 Montgomery
Union Con S M Co, Nev	53	20c	Aug 25..Sept 28..Oct 22	A P Swain, 309 Montgomery

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Gray Eagle M Co, Cal	W J Gurnett, 308 Pine	Sept 16
Mono G M Co, Cal	J W Pew, 310 Pine	Sept 17
Old Flag M Co, Cal	F L Olmsted, 315 Montgomery	Sept 8

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Assessment Notices.

BELCHER SILVER MINING COMPANY. Location of principal place of business San Francisco, California, location of works, Gold Hill, Storey County, Nevada

Notice is hereby given that at a meeting of the Board of Directors, held on the 5th day of August, 1896, an assessment (No. 35) of twenty-five cents ($25) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, room No. 37, third floor, Mills Building, N. E corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of September, 1896 will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on WEDNESDAY the 30th day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. PERKINS, Secretary.

Office—Room 37, third floor, Mills Building, N. E corner Bush and Montgomery streets, San Francisco California.

JAMISON MINING COMPANY. Location of principal place of business San Francisco, California. Location of works, on Little Jamison Creek, near Johnsville Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixth day of July, 1896, an assessment (No. 8) of five cents ($5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, 320 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of August, 1896, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 31st day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

POSTPONEMENT.

At a meeting of the Board of Directors o the Jamison Mining Company, held on the 22nd day of July, 1896, it was resolved that any stock upon which the assessment shall remain unpaid on the seventh day of September, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on MONDAY, September 28th, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

SAM W. CHEYNEY, Secretary.

ANCHOR COAL AND DEVELOPMENT COMPANY. Location of principal place of business, San Francisco, California; location of works, Kelso, Cowlitz county, Washington.

Notice is hereby given that at a meeting of the Board of Directors held on the 24th day of August, 1896, an assessment (No. 7) of Three Cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market Street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-fourth (24th) day of September, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the twenty-fourth (24th) day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. D. FARISH, Secretary.

Office—No. 632 Market Street, Room 5, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the first day of September, 1896, an assessment (No. 79) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the fifth (5th) day of October, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 27th day of October, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69 Nevada Block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 2d day of September, 1896, an assessment (No. 24) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of October, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 29th day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from W. H. Leek, in the Miocene mine, near Crescent Mills, Plumas Co., to deposit tailings in Rush creek; from Hugh Craig, in the Wasajo mine, near West Point, Calaveras Co., to deposit tailings in the middle fork of the Mokelumne River; and from John Faubel, in the Mad Mule mine, near Stella, Shasta Co., to deposit tailings on the bank of Whisky creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on September 21, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from W. A. Keefer, in the Aleyone Mine, near San Andreas, Calaveras Co., to deposit tailings in San Domingo Creek, and from J. R. Sears, in the French Claim, near Indian Diggings, El Dorado Co., to deposit tailings on the bank of Clear Creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on September 14, 1896, at 1:30 P. M.

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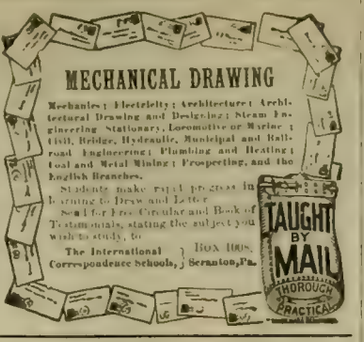
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DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

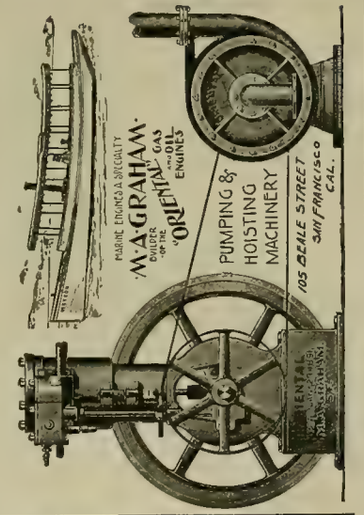
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Cert.	No. Shares.	Amt.
E. C. Cain	170	2,500	50 00
E. C. Cain	171	2,500	50 00
C. L. Dingley, Jr.	72	800	16 00
C. L. Dingley, Jr	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	160	3,803	76 06
E. C. Godfrey, Trustee	160	6,667	133 34
E. C. Godfrey, Trustee	166	1,333	26 64
E. C. Godfrey, Trustee	167	1,809	36 18
E. C. Godfrey, Trustee	141	1,667	33 34
E. C. Godfrey, Trustee	142	3,000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	83	2,000	40 00
J. F. K. Landis	138	1,000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6,000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2,500	50 00
Jos. A. Pratt	2	2,500	50 00
Jos. A. Pratt	3	2,500	50 00
Jos. A. Pratt	54	2,500	50 00
John E. Todd	5	2,500	50 00
John E. Todd	6	2,500	50 00
John E. Todd	9	2,500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.



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SAN FRANCISCO, CAL.

READ WHAT MINERS THINK OF THE BRYAN IMPROVED ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.
The mills require very little attention. At our mill an ordinary peon," earning one dollar per day, has complete charge.

In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly.

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK. Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly,

JOHN BECK. Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY.
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly.

[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO.
C. C. McIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year.

CHAS. C. McIVER, President.

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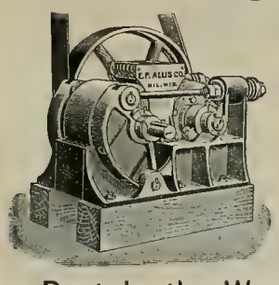

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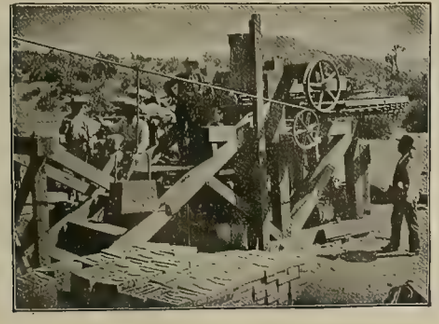

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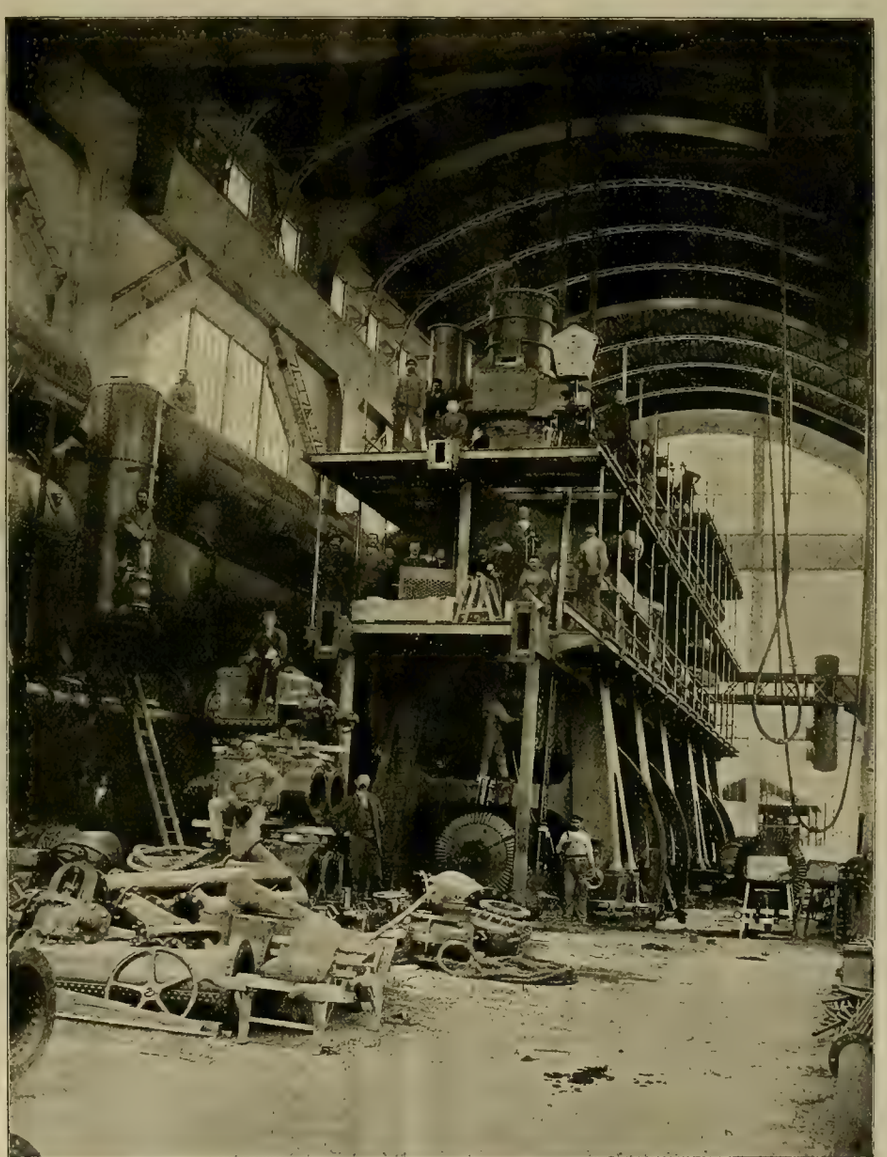
MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1888.—VOLUME LXXIII. Number 11. SAN FRANCISCO, SATURDAY, SEPTEMBER 12, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Air Compressing on a Large Scale.

The engraving on this page shows graphically what is being done in air compressing plants on a large scale. The cut which appears here for the first time in this country is of a Riedler compressor plant, Quai De Gare, Paris, France, where four with triple expansion engines of two thousand horse-power each, are used for a system of pneumatic power distribution, and have, according to official tests, proved economical, requiring 60 per cent less fuel than the other compressors in the Paris Central station, owned by the same parties and working under similar conditions, the total cost of work being reduced at the rate of 1 to 2½ as compared with the ordinary system of compressors formerly used at the Paris Central plant.



RIEDLER COMPRESSOR PLANT, QUAI DE GARE, PARIS, FRANCE.

In this type of compressor the valves are allowed to open freely by the action of the air, while the closing is done by positive valve gear. The valve chamber, as a rule, contains only one suction and one discharge valve. The valve spindle, passing through the the chamber closes the valves at the moment when the stroke of the piston changes. Near the end of the stroke a very small lift is allowed to the valve, which can be regulated at will, thus affording a relief for the valve under high speeds and variable pressures.

In high speed compressors springs are inserted either in the closing gear or on the valves, so that by compression of the springs the action of the valves is modified to meet increased resistance and variable conditions of working. The ordinary resistance the valves meet is so slight that it will not compress the springs. The movement to operate the gear may be taken from any part of the motor; for instance, from a wrist plate, as in the case of a Corliss engine. All that is required is that the valve shall receive a rocking motion similar to the reciprocating motion of a slide valve. Large compressor valves are provided with cushions which allow them to open freely, but which prevent them from opening beyond a desirable limit. This ensures the valves remaining fully open during suction or discharge until they are closed by the action of the valve gear described. The valve motion can be derived from the same eccentric which operates the steam valve, either directly or through a wrist plate. The arrangement of the gear in special cases may be widely modified, but it always accomplishes the same purpose, controlling the suction and discharge valves mechanically.

The compressor proper, as here described, can be made of any style that may be deemed advisable, either simple or compound, or even triple, cylinder. In most cases the air is not used at so high a pressure as to require compression in three stages.

The horizontal style of compressor, driven by compound condensing Corliss engines and with compound air cylinders, will generally be found the most economical and convenient, although the vertical style of engine has some advantages over the horizontal, notably in space, and because the weight of the piston does not cause the cylinder to wear oval.

These compressors are built by Fraser & Chalmers, London and Chicago.

In speaking of the advantage of employing local engineers, in the London *Mining Journal*, Thomas Tonge says: "British capitalists would do well to utilize to a much greater extent Colorado mining engineers and experts, and, judging by past experience, would save large sums of money by so doing, not merely in traveling expenses from England but in the better and more reliable advice they would get. There are in Colorado considerably over a dozen mining engineers and experts, both British and American, of many years local experience and unblemished reputation, who must of necessity be more competent to pass opinions on the merits of a mining property in Colorado than any man sent from England to Colorado, possibly for the first time, and at best only an occasional and transient visitor." An evidence that the British syndicates appreciate the advantage of local experts for making examinations of mines for them is the fact that they are calling upon the leading California engineers for such work almost exclusively in California. The splendid reputations made by engineers from this State all over the world has done much to inspire the British with a confidence not only in the ability, but in the integrity of our leading men in that profession, and to-day the whole mining world looks to California more than anywhere else, not only for its miners, but for the newest and best methods in mining in many respects. It is for this reason, too, that the MINING AND SCIENTIFIC PRESS has a larger circulation than any other mining journal published in America and circulates more widely than any other mining journal in the world.

THE steady growth of the mining industry in Mexico since the present mining law came into force in 1892 is shown by the number of titles to mines issued in each fiscal year since then as follows: 1892-93, 417 titles, covering 2660 hectares; fiscal year 1883-94, 961 titles, covering 5830 hectares; fiscal year 1894-95, 1044 titles, covering 7860 hectares; fiscal year 1895-96, 1924 titles, covering 15,451 hectares; total, 4346 titles, covering 31,803 hectares.

THE business at the United States land offices in the West is larger than it has been for years, due largely to the increased activity in mining. While a large proportion of the filings are for agricultural lands, they are the direct result of mining activity.

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J. F. HALLORAN.....General Manager

San Francisco, September 12, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Riedler Compressor Plant, Quai de Gare, France, 213. Car House and Trains on the Electrical Division of the N. Y., N. H. & H. Railroad, 217.
ELECTRICAL PROGRESS.—Operation of the Nantasket Train by Electricity; Path for the Return Current, 217.
SCIENTIFIC PROGRESS.—Recent Archæological Discoveries; Injury to the Eye in Mining and Foundry Work; Weight Lifted by a Kite; Damage by Lightning, 217-218.
MECHANICAL PROGRESS.—Force of Water Pressure; Necessities of the Primitive Founder; British Exports of Iron and Steel to the United States; Chlorate of Potash Works, 218.
PRACTICAL INFORMATION.—Uncle Sam's Warships; Prices of Gas; The Manchester Ship Canal; The Way to Test Linen, 218.
MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 222-23.
THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 230.
MISCELLANEOUS.—Concentrates, 215. The Accumulation of Amalgam on Copper Plates, 216. Vein Walls, 216-217. California Mines and Miners, 218-219. Cycle Telegraphs in War, 221. Coast Industrial Notes; Personal; Patents; Notices of Recent Patents; Obituary, 224. Recent California Mining Incorporations; Commercial Paragraph; Recently Declared Mining Dividends, 231.
EDITORIAL.—Air Compressing on a Large Scale; The Advantage of Employing Local Engineers; Growth of the Mining Industry in Mexico; Increase of Business in the Land Offices of the West, 213. A New Feature of the Geological Survey; The Miners' Association; Shifting of Old Lines in Mining; Dividends in California Mining Corporations; Dividends of the Pioneer, S. A., Mine, 214.

A New Feature of the Geological Survey.

To find the landmarks of the township and section corners of our public land surveys has always been the burden of the county surveyor's life, even in carefully surveyed and carefully marked districts. But the pernicious system of public land surveys by contract has led to such abominable work that the finding of these landmarks is often an entire impossibility, even when they are correctly surveyed. Throughout large districts, especially in the arid regions, corners, when marked at all, were indicated by some such makeshift as a cottonwood stake or a loose stone, which are now often misplaced or destroyed.

The following telegram shows a disposition on the part of the Geological Survey to aid matters a great deal by the re-establishment of permanent Township corners over areas covered in the process of topographic mapping:

CHEYENNE, Wyo., Sept. 1.—The United States Geological Survey is commencing a most important work in this State. It consists in placing iron monuments at each township corner with bench marks. The work which will be commenced first is in Laramie county where over 3000 sqare miles of country will be thus marked. The posts are iron tubing 3½ inches in diameter and 4 feet long. They are swelled out with a flange at the bottom and will be sunk 3 feet in the ground with one foot extending above the surface. On the top is fastened a brass plate on which is stamped "United States Geological Survey" and "B. M." The elevation, township and range numbers will be stamped on the plate by dies carried by the engineers. The posts will be painted with abestos paint and will be practically indestructible. In the future all Government surveys will be marked in this manner in the West. The system will be of immense benefit to settlers and ranchmen in this State, the system used prior to the present time to mark Government surveys having been of little service.

This additional feature to the methods of the survey is due to an agitation started by Mr. Ellwood Meade, State Engineer of Wyoming. But the remarking of township corners was not the principal object Mr. Meade and his supporters had in view. On the contour maps of the interior plains there are too few distinctive topographic features to give the traveler any definite method of determining his location, even approximately, upon the map. In a country as rough as the Sierra Nevadas there is always some prominent hill, stream or cross-roads or some other feature indicated upon the map by which to locate himself. But in the expanseless plains the rolling hills have such a confusing sameness, with no distinctive points within the horizon, that topographic maps are well nigh useless. By the establishment of permanent, well-marked stations indicated upon the maps some definite means of location is offered. Another advantage in the re-establishment of the township corners and their indication upon the maps is that it makes it possible to tie the land surveys on to the Geological Survey maps—an impossibility hitherto. And again by indicating the elevation upon each of these corners, is furnished invaluable data for datum points in engineering work requiring greater accuracy.

The location of these corners offers a valuable check upon the work of the survey. Heretofore the details of a hill and canyon might be well enough delineated upon the map for a person standing upon the hilltop to realize which hill he stood upon, but, without a resurvey, he could not know whether the distance to the next hilltop was correctly indicated. Those whose duty it has been to resurvey some of the work of the Geological Survey too well know the frequency of such errors.

But, by all means, the most important and invaluable feature of the working of definite points upon the ground, and their indication upon the maps, is the reactionary effect upon the employees of the survey. The last error mentioned, and many others altogether too frequent in the work done from 1882-1888, were due to sketching great areas from some prominent hilltop. In substance, the new method guarantees that the employees must conscientiously traverse the ground. The premium placed upon cheap work by past principals of the survey has resulted in a vast waste of public money and any additional check on accuracy cannot but be cheaper in the end. The remarking or at least the indicating of township corners may for these reasons be well applied to other regions than Wyoming.

To Mr. Meade is due the credit for the suggestion and adoption of the idea. But the Geological Survey under Director Walcott has shown itself willing and anxious to meet the public demands and to him is due the credit for the policy of practical results exhibited in so many directions.

ONE of the mines of the Rand, the Pioneer, has declared in dividends this year up to the first of August, a total of 200 per cent upon the capital. To record this is refreshing in view of so many cases of overcapitalization. There is not a mail that does not bring to us exchanges, published in the interest of miners, which protest against this overcapitalization, and warn their readers against countenancing it. Papers from Australia, from New Zealand, from British Columbia, from Oregon, and from all over California, continually speak of evils done by promoters who have taken under bond good mines that would pay a reasonable profit upon a fair investment and had them placed upon distant markets at far more than their real value. In most of these cases the vendor—"the honest miner"—receives but a fair price for his property, the balance going to the harpies.

THE public seldom hears of any dividends paid on shares in California mining corporations; this is not an indication that such dividends are not paid. There are a number of large mines in California that pay dividends that would be interesting to the public at large on account of their magnitude, but these mines are controlled as close corporations and worked by the individuals who own them as purely business enterprises. Mining in California is generally conducted upon these lines. The average Californian is much more interested in making money legitimately out of mining as a business than through the stock jobbing methods that were so much in vogue a few years ago. It is probably for this reason, as much as anything else, that foreign capitalists are so much inclined to seek for investments here.

THERE has been of late a shifting of old lines in mining. Extensive gravel mines are being opened up in Idaho, Wyoming and Colorado; copper deposits that promise to develop into big mines have lately been discovered in northern California and southern Oregon, while in Nevada there have come many reports of opening up of free gold quartz mines. Miners are learning to expect more than one kind of ore in a district. Much more is known of the occurrence of minerals and as a result more intelligent work is being done by prospectors.

The Miners' Association.

In connection with the coming annual meeting of the California Miners' Association, in November, we have received from the Secretary, Julian Sonntag, some facts as to what the organization has accomplished and as to its needs. It is worth the attention of miners and we present his statement, as follows:

Within the past three months the question has often been asked me, as secretary of the California Miners' Association, "What are you going to do at the annual meeting of the Association, to be held in this city in November next, and what have you done during this year?" Through your paper I wish to offer some suggestions and facts.

The California Miners' Association is no longer an experiment, but a permanent organization. Through the medium of this organization, a greater interest has been taken in mining in California; it has brought to the attention of the European, as well as the Eastern public, the fact that to-day California is but in its infancy in mining.

It has brought to the attention of Congress the fact that the miner has some rights which must be recognized. It has through its influence caused the Caminetti act to be passed, has obtained an appropriation from Congress of $250,000 for the erection of dams and came within an ace of passing the Mineral Land Bill. To-day, through its work, 132 hydraulic mines have been granted permits to operate and the great injustice that has been done the hydraulic miners has been partially righted. It has urged upon the Secretary of the Interior to withhold all patents to the Southern Pacific Railway Company until the standing as to their indebtedness to the United States Government has been fully determined. It is now being done—at least it was done during the last month of Hoke Smith's incumbency of the office of Secretary of the Interior—and before the 54th Congress convenes we hope to have the Mineral Land Bill passed and save the few remaining acres to be patented as mineral land.

This coming year the miners of America want a Secretary of Mines and Mining, and the miners of America do not merely want a politician, but a man who will prove a credit to the nation, to his calling and to himself. And the California Miners' Association wants to take the first steps toward such a movement, thereby securing a right to which they are justly entitled.

The worth of the California Miners' Association is not yet fully appreciated by the miners themselves. This is shown by the fact that last year nine of the leading mining counties have collectively paid into the treasury less than $50, and had it not been for Nevada, Placer, Trinity, Sierra, Yuba and San Francisco, which counties paid in over $5000 between October 1st, 1895, and September 1st, 1896, we would have been unable to maintain a representative in Washington during the last session of Congress, whose expenses alone amounted to $3211.55. The balance was principally used for paying the indebtedness of the association contracted during 1895. Not one dollar went towards paying any traveling expenses or salaries of the association's officers. What a contrast this is to the Anti-Debris Association, whose annual expenses for rent, secretary, agents, spies, attorneys, etc., amount annually to $10,000—and the poor, deluded farmer is the loser. Why they have not yet had their eyes opened is a mystery.

The California Miners' Association has been fortunate in having within its fold a few men of the legal profession, who at all times have been ready and willing to render assistance upon questions as to mining law, its interpretation and decisions. I now particularly refer to Messrs. Wright, Ford and Ricketts.

The secretary should have an office especially for business of the California Miners' Association, where he can be found at certain hours of the day, and an assistant who shall be at the office from 9 A. M. until 4 P. M. daily to answer all questions appertaining to the business of the office; should make it the headquarters of members where they can meet, discuss, write or read, as their business or pleasure may dictate; where all important papers, books or pamphlets appertaining to mining should be kept on file; and where the Executive Committee should hold their monthly meetings.

In conclusion, I deem that at all times the president of the Association should be a miner, whose principal occupation is that of mining, and that he be a conservative and impartial man. It is with the deepest regret that I am authoritatively informed of the retirement in November next of our worthy president, Hon. Jacob H. Neff, who has served the Association since its beginning in the capacity of its chief executive officer, in a manner that has proven him to be a peer amongst men and has endeared him to the miners of California by his honest and faithful efforts, and it behooves the delegates to be appointed by different county organizations to the annual convention to be careful to select a man to this position who will prove a worthy successor.

Concentrates.

THERE are thirteen boats plying on the Yukon.

THE August profit of the Simmer & Jack, South Africa mine was $95,000.

THERE is a general resumption of work in the Rhodesia, South Africa mines.

OF the world's output of coal last year, the United States produced 30 per cent.

A NUMBER of Leadville miners have gone to Butte, Montana, looking for employment.

THE Fifth National Irrigation Congress will be held in Phœnix, Arizona, Dec. 15, 16 and 17.

THE French Creek Mining Company near Ætna, Siskiyou county, is to enlarge its mill to ten stamps.

THERE was picked up a 47-ounce gold nugget lately, valued at $765, near Hawkinsville, Siskiyou county.

THE owners of the Reward mine at Pine Grove, Amador county contemplate erecting ten additional stamps.

THE Red Jacket shaft in the Calumet & Hecla copper mine, which was started in 1880, is down to a depth of 4900 feet.

A 30-STAMP mill with concentrators and a general reduction works are to be built near the Clifton tunnel near Austin, Nevada.

IN the Pierce City mining district, Idaho, a booming process for working the gravels is in use and a number of reservoirs are being built.

AT Randsburg, Kern county, they are staking out town lots and a new stage line with six-horse coaches from the railroad is contemplated.

THE Bi-metallic drain tunnel to tap the Bi-metallic mine, near Philipsburg, Montana, was completed last week and is 8200 feet in length.

ON Williams creek, in Cariboo, the Cariboo Gold Fields Co. are, it said, going to spend a million dollars in development work on that stream.

A COMPANY has been organized at Great Falls, Montana, to work the auriferous gravel in the Missouri river, near Townsend, with dredgers.

IT is said to be the intention of the Anaconda Company of Montana to continue sinking one of their shafts now down 1400 feet to a depth of 4000.

THE '95 gold output of New South Wales was 360,016 ounces, the largest annual yield since 1873, when the aggregate in that country was 361,784 ounces.

NEGOTIATIONS are pending for the purchase of the War Eagle mine in British Columbia which has been bonded to D. C. Corbin. The price is said to be $1,000,000.

PREPARATIONS are being made to open up the Cherokee Flat mine in Butte county as a drift mine, the litigation which has tied it up for many years having come to an end.

W. H. STORMS, Charles G. Yale, H. S. Durden, W. A. Hall and R. S. Clark have organized the Junction Mining Company to work property near Soulsbyville, Tuolumne county.

THE Shellberger placer mine at Osceola, Nevada, recently cleaned up $12,000 from twenty-four days' work. There is much rich gravel in that vicinity, but very little water.

THE Providence Mining Company have decided not to rebuild their recently destroyed chlorination works. Satisfactory arrangements have been made by which they will be able to dispose of their sulphurets.

THE New Denver, B. C., *Ledge* says that, owing to the unsatisfactory condition of the price of silver, it is probable that some of the larger properties in the Slocan will close down until after the election in the States.

THE Olive Mining Company, organized at Spokane with a capital of $20,000,000 to work the Volcanic mine on Kettle river, B. C., claim that they have an ore body, carrying gold, silver and copper, 600 feet wide and 3000 feet long.

THERE were reported by the British Columbia *Gazette* of Aug. 20th six new mining incorporations—two with a capital stock of $1,000,000 each, two of $750,000, one of $500,000 and one of $75,000. The shares in each case are placed at $1 each.

THE Trail Mining Company, in the Kootenay district, B. C., in running a lower tunnel 8 feet wide have two power drills, side by side, in the face; fire the blasts by electricity, putting off fourteen shots at a time, and are making 8 feet per day.

THE Consolidated Asphalt Company has subleased the right to mine for asphalt upon the Guadalupe rancho, in Santa Barbara county, for a term of years, from William Horswick, the original lessee from Rene de Tocqueville, the owner, for $100,000.

DR. V. T. MCGILLICUDDY, dean of the School of Mines of South Dakota and F. C. Smith, Professor of Geology and Metallurgy, have gone to Portland, in that State, to begin a geological and topographical survey of the Bald mountain and Ruby Basin district.

A. H. EDDY, of Hartford, Wash., has returned from Alaska, where he reports having discovered two petroleum wells in the mountains, not far back from the coast and within 100 miles of Juneau. He claims that there is a flow of 200 to 300 barrels daily from each well.

IT is reported that in the Diamond Hill mines in Montana, which were lately purchased by a Scotch syndicate, a new vein of rich free milling ore has been discovered. The machinery for the new 140-stamp mill to be erected at this property has been ordered in San Francisco.

SOME people at Needles are looking into a proposition to put a big pumping plant on the Colorado river, near old Liverpool landing, to pump water across the range to work the big placer grounds on the eastern slope. There are said to be rich deposits in the Chimehuevas mountains.

HEMRICH, HEDGES & BROWN have bought the property of the San Jose Mining Company, Eagle canyon, Cherry Creek, for $30,000, and will put in a cyanide plant. This property was formerly superintended by Gen. W. S. Rosecrans, when owned and worked by the Donohoe-Kelly bank of San Francisco.

LAST week the result of the "washup" of the Cariboo placer mine in British Columbia for 80 days' run was shipped to Montreal. It was in a single cone-shaped mass weighing 400 pounds and was valued at $81,622. The mine is in charge of J. B. Hobson, formerly of Placer county, in this State.

THE seventy-first meeting of the American Institute of Mining Engineers will be held at Denver, Col., beginning on Monday, September 21st. The programme as announced by the secretary includes several excursions to Cripple Creek, Leadville and other points in the Colorado mining regions.

THE Blue Lakes Water Company is making contracts for an 1800-horse power electric plant, to operate at 10,000 volts, to be erected about a mile from Mokelumne Hill for the purpose of supplying power to the mines in Amador and Calaveras counties. It is proposed eventually to take power on to Stockton.

AT the Broken Hill Proprietary, Australia, for the four weeks ending August 20, the amount of ore treated was 32,182 tons. Refinery products: gold, 450 ozs., fine; silver, 561,241 ozs., fine; soft lead, 1,079 tons; antimonial lead, 20 tons; copper matte, containing 219 tons, 54 tons copper, 34,198 ozs. fine silver.

THE season of forest fires has opened, and there is reported considerable destruction in the Sierras about Tahoe and throughout Idaho, Washington and British Columbia. In the Slocan country the miners are having some difficulty from this source, and, in cases, prospectors are driven out of the mountains.

A PRELIMINARY report of the census of Johannesburg shows the total population to be 102,714. Of these 51,225 are whites, 44,396 native aborigines, and 7093 mixed races. Of the adults there are 72,000 males, against only 14,000 females. Of the white population there are 25,000 adult males, against 10,000 females, above fifteen years of age.

THE manager of the Gold Ore Treatment Co., Coolgardie, West Australia, reports that by the bromo-cyanide process tailings from mines at Menzies, treated with a 2 per cent cyanide of potassium solution and .05 per cent cyanogen bromide secured 14 dwts. 5 grs. per ton from tailings averaging 16 dwts. 8 grs. per ton in twenty hours.

THE Steeple Rock Development Company has secured control of over 100 mining claims, chiefly gold propositions in the Carlisle and Steeple Rock districts. A force of miners has been employed for more than a year in the development of mines owned or bonded by the company, and a quantity of ore is exposed and ready to be taken out.

THE number of names in the great register of Calaveras county this year is 3900, against 3620 for 1894—an indication that the mining industry of that county is not on the wane. A census showing the increase of the population of the different counties of California during the past two years would show the mining counties far in the lead.

AT the Gagnon mine in Montana a safety device has been adopted, consisting of an electric alarm system in the various workings of the mine, so that in case of fire the miners can be at once notified of its location. The mine has also been wired in duplicate so that the electricity from the city current can be used in case of accident to its own plant.

THE following advertisement appeared lately in a southern Oregon paper: "One-fourth interest in a mining claim in the Applegate district, that assays gold, silver, lead and copper, for a No. 1 team, wagon and harness; team to weigh not less than 2400; mares preferred. It will pay some one who has horses to sell to investigate this proposition."

THE *Democratic Times* of Jacksonville, Oregon, says: "Among the lands included in the patents to the railroad company, recently filed, are several tracts which have been claimed as mineral for several years, and against the patenting of which the owners filed protests. They are quite anxious to know why their contests were ignored."

SUBSCRIPTIONS are being invited in London for shares in the "Gold Fields of Mexico, Limited," capital £100,000, of which £60,000 is being issued. The company is formed to carry on business as a promoting financial and mining company, and its first enterprise will be to purchase and deal with the auriferous district of Huruapa, Chihuahua, Mexico.

SINCE the great increase in the consumption of cyanide of potassium, most of which made in Europe came from England, German chemical firms have engaged in competition with immediate and overpowering effect. According to *Industries and Iron*, an English journal, not only is their chemical cheaper, but it is purer than that of English make.

GOVERNMENT commissioners are treating with the Fort Hall Indians of Idaho, Uintahs of Utah, Agriemas of Washington, and the Crows, Cheyennes and Flatheads of Montana, to agree on a certain portion of the Fort Hall reservation south of Ross Fork and surrounding Pocatello, to be cut off and placed on public sale. This strip comprises a large area of mineral lands.

IT is announced that the Silver King of Park City, Utah, which has paid $787,000 in dividends, will, while lead is so low, keep their supply out of the market and cease paying dividends for a time. The suspension of dividends will reduce the income of the stockholders by $112,500 for the remainder of the present year, unless there should be a marked advance in the price of lead.

THE Minas Prietas and La Colorado mines of Sonora, Mexico, have been purchased by an English company which has a capital of £250,000 in £1 shares. The mines were examined and reported on for the Exploration Company by Henry Janin of this city and John B. Farrish of Denver, Col. The output of the mine was $111,000 in June; July, same amount; first half of August, $117,000, with 33 stamps running.

SHORTLY before his death the late William L. Ralston of this city opened up some big mines in Owyhee county, Idaho, but they were closed down shortly after his death and have not been worked since. Lately the Spokane and South Mountain Mining and Milling Company was incorporated with a capital of $3,000,000 to take hold of and work them. It is proposed to build a railroad from Booneville to the mines.

IT IS claimed that the gold product of the Black Hills for the present year will be $10,000,000, with a probability of reaching $12,000,000. The estimate is based on the product of the mines now in operation for the past eight months, which have averaged 15,000 tons per month of siliceous ores from the Bald mountain section and 500 tons of the same character of ore per month from Yellow Creek camp and the properties in and around Lead. The output of free milling ores will aggregate for the year, in round numbers, 950,000 tons, principally by the Homestake and associate companies.

THE announcement of intention to close down the Mingo smelter near Salt Lake and the notification by the manager of the Germania lead works, located near the same place, that until further notice the rates for the treatment of the low-grade ores worked there would be increased $1.50 and $2 per ton, has had a depressing effect upon ore shippers. Heretofore the uniform charge has been $4 per ton, but by the new schedule it is increased to $5.50 and $6.

THE Denver *Mining Industry* says: "In California, according to the California Mining Bureau, there are almost twice as many mines in operation, employing a corresponding increase of miners, as there were one year ago. It is the only State in the West which officially tries to obtain facts, and publish the same, regarding the mining industry, consequently no one can tell, except in a general way, whether there is any improvement in the mining situation compared with one year ago."

THE first gold obtained in California was found in the southern part of the State before Marshall made his discovery at Sutter's mill in El Dorado county, and yet that part of the State has done little compared with the mines of the north. However, with the great number of discoveries of good mines within the past year, it promises to produce a large amount of bullion. The want of water and timber has been a drawback to mining on a small scale, and without large capital, but the value of mines in San Bernardino, San Diego and Los Angeles counties lately opened promises to force the attention of the mining world.

THE Rossland *Miner* claims that through the development of the mines British Columbia will in a few years have a population of a million, and says: "Much of the population at present is American and transient in character, but as time moves on and the possibilities of the country disclose themselves many of these enterprising Americans will become permanent residents, if not qualified subjects. Americans find the atmosphere of British Columbia a very congenial one. They like the respect for law and order everywhere apparent. They like the security afforded to property and business. They like the way labor is protected as well as capital."

W. A. CARLYLE, the provincial mineralogist, in a bulletin on the Trail Creek mines says that the output from Rossland this year will not show the predicted increase over that of last year for several reasons, although there is now much high-grade ore in sight. In the first place, better and cheaper means for transport of ore are being awaited, as the shipping mines are now in such position that they can afford to hold back their shipments for better rates. Again, the smelters have not until recently been in such working order as to be able to handle anywhere near the amount of ore it is proposed to treat. In some cases shipments have been suspended on account of the properties being bonded, or until the completion of underground workings that will make mining more advantageous.

THE first contest of the rock-drilling series took place last Monday evening at the State Fair at Sacramento. Each team was to work fifteen minutes on a perpendicular hole in a block of Folsom granite, and make as many changes as they desired. There were three prizes effered of $200, $150 and $50. Four teams were entered, as follows: First team—Frank F. Esola and A. L. Noce of Amador City; second team—J. M. Ketto and William Hancock of Sutter Creek; third team—S. B. Harvey and J. Jefford, of Jackson, Amador county; fourth team—James Browan and E. Pope of Coulterville. A great deal of interest was manifested, the crowd deserting the main hall for the machinery hall while the contest was in progress. Noce and Esola won the first prize, drilling 33 5-16 inches; Pope and Browan second, with 28 11-16 inches, and Jefford and Hancock third with 28 7-16 inches; Ketto and Harvey making 28 1-16 inches.

THE Northwest Mining Association will hold its second annual convention October 6th, 7th and 8th in Spokane, Wash. It is expected that 2000 miners will attend. The rapid growth of the mining industry in the Northwestern States and British Columbia has turned the attention of the people of all that country to mining more than anything else. During the past year the Mining Association has appointed 225 vice-presidents, each representing a separate local branch organization, all within the States of Washington, Montana, Idaho, Oregon and the Province of British Columbia. Each of these branches will send a delegation of one member for each five members of the branch. During the convention there will be held an exhibition at Spokane of crude ores, concentrates, bullion and of mining machinery and methods. An important feature of the convention will be the reading of papers by leading mining engineers and geologists of the Northwest.

THE African *Mining Journal*, speaking of the Jameson matter, says: "It is just seven months since Dr. Jameson made his bold bid for a united South Africa, and the sentence imposed on Thursday adequately conveys the sense of his contemporaries upon his mistake. The feeling is, generally, that since the attempt failed, Dr. Jameson and his companions are men enough to accept the consequences of their defeat, and that anything like wailing appeals for mitigation of punishment are in the highest degree undesirable. It is reported by the Government organ here that two members of the English Parliament have communicated with President Kruger, asking for his intercession on behalf of the prisoners. We can only hope that this is untrue; for if it be correct, those members of Parliament should be promptly hung. Their constituents should certainly have something to say to them. It is reported that the Executive Council at Pretoria met on the receipt of the news of the sentences, and cabled its desire that clemency should be exhibited towards the prisoners, intimating that it had no feeling against them, but rather wished to see the organizers of the raid brought to justice. An act of this kind is merely another appeal to the little Englander party and to the Liberals to exert their influence against Lord Salisbury's Cabinet, in the hope that it can be overthrown. It is a move to increase the reputation of President Kruger, in order to bring into stronger relief the wickedness and rascality of his opponents who planned to injure his innocence. Astute as it is, it must be sincerely hoped that the Imperial Government will refuse to be entrapped, and will for the present leave Jameson and his friends where they are. If one other thing were needed to overwhelm the whole raid and revolution in ridicule, it is their release after a few days of Holloway jail."

The Accumulation of Amalgam on Copper Plates.*

NUMBER IV—CONCLUDED.

Communications in discussion of the paper of MR. R. T. BAYLISS, presented at the Pittsburg meeting.

The experiments were carried on with very soft and "wet" plates, and it is to be presumed that such conditions would favor early absorption. Certainly there is no possibility of accumulations of hard amalgam to any considerable thickness on the plates of the Standard Company's mill, and it will be admitted that a coating of $\frac{16}{100}$ to $\frac{1}{16}$ inch is, to say the least, extraordinary. It would seem that a judicious use of the steel scraper would have prevented this, with no appreciable harm to the plates. The plates in the Standard mill have been relieved of the harder amalgam with a steel scraper for four and one-half years, and are to-day in prime condition.

The second point of the high silver ratio of the adhering amalgam can, to a large extent at least, be traced to the stiffness of silver amalgam, which is a very noticeable feature of it. This would resist removal by the rubber scraper more than the softer gold amalgam.

In this connection it would have been interesting to have had recorded the ratio of silver to gold in the bar resulting from the destruction of the plate, for comparison with the ratio in the amalgam. In the experiments here recorded it is noticeable that the ratio is but 10 to 14 parts silver to 100 parts gold, while the average plate amalgam gives about 75 silver to 100 gold. The plate, then, exerts a straining action, being more permeable to gold than to silver amalgam. This is borne out by the extra tests on an old piece of copper sluice plate. The amalgam scraped from its surface carried gold and silver in the ratio of 100 : 77, while the plate itself showed but 100 : 17.

The whole question is one of commercial as well as scientific interest, and Mr. Bayliss should be thanked by all concerned in gold milling for having drawn attention to the facts.

Some additional experiments have been undertaken with the view of gaining data from more extended exposures to amalgam, and these will be reported to the Institute in due time.

MR. BAYLISS: The interesting contributions to this discussion call for some notice and a few remarks in reply.

Mr. Godshall, in considering "the change in the relative quantity of the two metals in the scale amalgam as we recede from the battery discharge," accounts for the increasing proportion of silver on the thery that the gold in the ore amalgamates more easily, and, therefore, more quickly, than silver; but, in seeking for an explanation of the fact that the fineness of the bullion from scale amalgam differs so widely from the fineness of the bullion from the daily cleanups, he suggests that, after the two metals have passed into the form of amalgam, the silver therein contained has a greater affinity for the amalgamated (or scale-forming) surface than gold, and goes on to suggest that I have not taken into consideration that "the condition of the native silver in the ore may be very different, or its behavior very different, from that of the same silver after amalgamation." In this distinction he finds a solution of the problem.

I submit this distinction is a very subtle one, and freely admit that I am unacquainted with the fact that the process of amalgamation reverses the relative affinity of gold and silver for an amalgamated surface, if any such difference exists.

The experience of Mr. Collins in the Hidden Treasure mill at Black Hawk, Col., does not appear to be quite in line with the case under review, as his mill was largely employed in the treatment of custom ores, which, if paid for on mill returns (as would seem to be the practice), would necessitate the careful recovery of accumulated amalgam after each operation. It is, however, of interest to note that the value of Mr. Collins' plates after they had been thoroughly scoured, as determined by the Argo smelting works—namely, 8 ounces of fine gold per plate—corresponds very closely with the experience in the Drum Lummon mill, where the gold contents of a plate, after the removal of the scale, amounts to 8.96 ounces.

Mr. Collins, with some force and great fairness, challenges the practice of permitting the accumulation of amalgam as neither necessary nor advisable. I should be indisposed to defend such practice as a universal or arbitrary principle; for I am satisfied that special causes contribute to the accumulation of amalgam in the Drum Lummon mill in such a marked degree. But in this particular case the practice seems to be justified by the fact that careful records of the daily pulp and tailing samples taken from batteries served, on the one hand by a plate coated with this scale and on the other hand by a plate not so coated, and also, in another case, by a plate from which the scale had been removed by a steel scraper, proved beyond question that there was in the first instance an additional percentage of gold recovered, which completely outweighed the undoubted disadvantages of the practice, such as loss of interest on money, risk of possible loss from fire, etc. Moreover, the necessity for the practice in the Drum Lummon mill has been proved by the fact that it has been found impossible to remove the scale, which is extremely hard, by means of a steel scraper without injury to the plate itself and the destruction of its amalgamating efficiency.

Messrs. Brown and Turner seem to have mistaken the object in view in the substitution of new plates for old after the accumulated scale has been removed, inasmuch as they point to the result of their very interesting and complete experiment on the period covered by the absorption of amalgam by a new plate as evidence "that the destruction of plates for the sake of the absorbed amalgam may be poor economy." This impression on their part may be removed by the statement that the new plates are not substituted for the old for the purpose of recovering the amalgam still remaining on the latter, but because the drastic treatment to which the old plates have been subjected in the removal of the scale, as fully described in my paper, renders them wholly unfit for further use.

They remark also that "the high silver ratio of the adhering amalgam can, to a large extent at least, be traced to the stiffness of silver amalgam, which would resist removal by the rubber scraper more than the softer gold amalgam." In the case under discussion it is not possible to subscribe to this theory because experience tends to prove that the silver amalgam obtained from the Drum Lummon ores is not so stiff and solid as the gold amalgam.

The inquiry of Messrs. Brown and Turner as to "the ratio of silver to gold in the bar resulting from the destruction of the plate" reveals a strange conflict, in the case under discussion, with the results obtained by them in the experiment to test the absorption of gold and silver by copper plates. They report that the metal absorbed was in the ratio of "but 10 to 14 parts of silver to 100 parts of gold, while the average plate amalgam gave about 75 silver to 100 gold."

The copper plate at the Drum Lummon mill, on the other hand, upon being run into a bar, was found to contain 8.96 ounces gold and 9.62 ounces silver, or in the ratio of 98 parts gold to 100 parts silver; whereas the average plate amalgam from daily cleanups gives 82 parts of silver to 100 parts of gold, showing, in this instance, that the plate was apparently more permeable to silver than to gold amalgam, instead of the reverse, as proved by the tests in the Standard Consolidated mill.

And, completing the comparison by ratio throughout each stage of the amalgam obtained from the plate in question, we find:

1. Amalgam from cleanups contains gold 100, silver 82.
2. Amalgam from accumulated scale contains silver 100, gold 76.
3. Amalgam from vanner plates contains silver 100, gold 63.
4. Gold and silver absorbed in plates, gold 100, silver 93.

In conclusion, I submit that we must look to chemical, and not to mechanical, causes for the explanation of the two important facts raised in this discussion, namely, the excessive accumulation of scale and the variation in the relative value of gold and silver in the amalgam taken off the plates from day to day, as compared with that remaining on them in the form of scale. It is a question which I must, of necessity, leave in more capable hands, but in the solution of which I shall be pleased to assist by affording all the information at my command.

*Trans. Am. Inst. M. E., February, '96, meeting.

Vein Walls.*

NUMBER IV—CONCLUDED.

By T. A. RICKARD, State Geologist of Colorado.

(Condensed.)

This specimen, and numerous similar structures in the same mine, indicate that the rhodochrosite was the first laid down, replacing, in part at least, the crushed rock which encased an original line of fault-fissuring. Subsequently another fracturing occurred, and this time the line of least resistance was the rhodochrosite itself, which, being homogeneous, broke down its center. The shattered carbonate offered an easy prey to the sulphide-bearing waters which laid down the blende and galena. The presence of bits of rhodochrosite within the sulphide band indicates that the substitution was irregular. Later, new disturbing forces were at play and the vein was fractured, not only along its middle, as heretofore, but also along the lines of its contact with the encasing rock. These fractures were healed by the deposition of quartz, accompanied first by iron and copper pyrite, and then by rich silver-bearing minerals, such as the stephanite. The corrosion of the sandstone on the hanging had on that side irregularly widened the vein, so as to give it greater strength; therefore, the next movement—the last—took place along the footwall. This, apparently, resulted in nothing save the crushing of some of the encasing rock and the formation of a selvage, whose removal produced the cavity which was so striking a feature of the stope.

Another typical illustration of this structure is presented by the Amethyst-Last Chance vein, at Creede, Col., which is certainly a magnificent example of an ore break. The country rock, trachyte, has undergone multiple fracturing and ore has been deposited along the division planes, so that there are walls *ad libitum*. The regular ribbon structure produced by the deposition of agatized quartz in a sheeted rock is very beautifully marked, and the same process of silicification is further evidenced in those places where the lode consists of breccia, composed of pieces of country rock covered by concentric layers of agate. The lode itself is much wider than the pay streak of silver ore, which usually follows the footwall. On the hanging the boundary between vein and country is fairly discernible; on the foot less so, because for several feet beyond the ore there is a red jasperoid, which gradates into country.

In the Enterprise example each succeeding fracture occurred in the mineral deposit which had healed the previous fracture. In other instances the mineral deposit appears to have proved harder than the encasing rock, and the second fracturing took place near the original one, but in the soft rock, rather than in the hard vein, thereby producing a new break parallel to the first one, and close to it, causing a repetition of vein walls such as have already been described. Or there may be the production of companion fissures forming contemporaneous veins. Finally, the companion fissures may be so multiplied as to cause a sheeting of the country and the formation either of one vein and several, subordinate, smaller and parallel to it, or of a series of ore streaks united by mineralized country, so as to form one large lode.

The evidence of a multiplicity of fracturing, whether successive or contemporaneous, is the clue, I venture to believe, to many of the anomalies of vein structure. No district within my knowledge so well illustrates this aspect of the inquiry as Colorado's new El Dorado, Cripple Creek, in El Paso county, where gold veins occur as mineralized and enriched portions of dikes, phonolite and basalt, traversing masses of andesite tuff and breccia. Other types are observable, but these are to-day the most characteristic. The mineralized rock forming the vein and that less distinctly gold-bearing country which encloses it, have been subjected to such multiple fissuring as to produce a very marked division of the rock into parallel bands or sheets which may be a fraction of an inch apart or several yards. This structure can be seen no less in hand specimens than in blocks an acre big.

Cases also occur where there can be discerned a combination of both these types of multiple fissuring.

A line of weakness, or even a region of weakness, once developed in the earth's crust, is apt to continue to be a line of least resistance available for future fracturing. Even when a quartz vein is formed along a line of rupture, healing the break and strengthening it with a substance harder than the rock walls themselves, we may suppose that the next break will take place along the line of weakness presented by the imperfect cohesion existing along the plane of contact between the hard quartz and the less resisting rock.

The gradual penetration of mineral solutions into the immediately encasing country may finally obliterate the divisions due to multiple fissuring. The sheets of rock separating one from the other would be replaced by ore, and nothing might remain of the original structure save faint partings in the lode, such as are less evident to the eye than to the hand of the miner who instinctively uses them to assist him in breaking ore.

Thus, I believe, the collection of observations in various mining districts tends to the modification of that idea of clean-cut definition which accompanied the early ideas of vein structure. The evident contact between two dissimilar rocks, such as is seen along the walls of a dike, will be often found in veins to be replaced by an indistinct gradation from mineralized to unmineralized rock, originally the same, but now rendered unlike by the selecting action of chemical solutions.

We are justified, however, in putting some limit to the depth of possible ore formation, since that formation is dependent on the presence of water. The record of the largest number of careful observations has shown that as we sink into the earth the increment of temperature is 1° F. per each 48 feet of descent. At this rate the critical point of water would be reached at 34,704 feet, or 6⅔ miles from the surface. Where the temperature is that of the critical point (773° F.) water cannot exist as a liquid, no matter how great the pressure, but becomes dissociated into its gaseous elements. Moreover, we are warranted in believing that the thermometrical gradient becomes more rapid at depths beyond those reached by human observation, because of a decreased conductivity in the rocks, or, as Prof. Prestwich, the best authority on these matters, puts it:

> Taking into consideration the probable limitation of the percolation of water, and the possible diminution of conductivity with increase of depth, if there should be any alteration in the thermometric gradient, at great depth, it will be more likely to be in the direction influenced by these more or less certain factors.

Therefore, taking these conditions into consideration, we may expect the circulation of water to cease

*Trans. Am. Inst. M. E.

at 20,000 feet or thereabout; but at the maximum depth the maxima of temperature and pressure must obtain. It must necessarily be a horizon of solution. Precipitation would hardly begin until a lowering of the temperature and a lessening of pressure permitted it. The deposition of ore is the direct result of precipitation; therefore, actual ore formation is likely to be limited to a depth often of 15,000 feet.

It is not difficult to surmise why clean-cut fractures are not necessarily most favorable to ore occurrence. In the Drum Lummon mine, Montana, the distribution of the ore appears to be connected with the change in the angle of intersection between the course of the veins and the strike of the slate country. Most of the ore bodies have been found where the course of the veins (N. 15° E.) cuts the slates at an oblique angle, and the levels run out of ore when their direction is either at right angles to, or conforms with, the strike of the country (N. 17° W).

In one of the surface workings of that mine which illustrates in miniature the fact above noted, is a small quartz seam, 2 inches wide, traversing the slates, whose structure is very clearly marked by the color bands following lines of original sedimentatation. The quartz follows a joint and becomes narrowed, while where it crosses (along a line of slight dislocation) the country, it has irregularities and bulges which answer to the alternating slate-bands. A rough, ragged fracture, when continuous, may be expected to offer more surface to solvent action and more, but not too many, obstacles to a rapid circulation of underground waters. Its structure also means more opposition to the closing in of the walls, because the irregular faces of the fracture, when they come together, leave openings which, if not along one section then along another, have inter-communication, and so permit of a passage which would be badly impeded, if not absolutely stopped, by the closing in of smooth walls.

This underground work bears daily testimony to the close dependence of ore occurrence upon the geological structure of the enclosing country, a relation the importance of which Mr. S. F. Emmons has done invaluable service by clearly stating in more than one of his contributions to the *Transactions*. Wanting a proper understanding of the structure of the rock encasing his vein, the miner gropes but blindly in a maze of tangled phenomena until the geologist, by their proper elucidation, gives him a light which dissipates much of the darkness obscuring his progress underground.

THE following is a list of the principal exhibitions open, so far as the engineering industries are concerned, and of those which will be opened in various parts of the world before the end of the century. 1896:—Industrial and Fine Arts, Odessa; International, Cannes; National, Geneva; Industrial, Berlin; International, Mexico; Exhibition at Para; Exhibition at Johannesburg; Industrial Arts, Barcelona; International Mining and Industrial, Denver (Colorado); Agricultural Machinery, Vienna; National Nijni-Novgorod; Motors and Automatic Carriages, Agricultural Hall, London. 1897:—International, Brussels; Rio Janeiro Exhibition; Central American, Guatemala; Exhibition at Brisbane; Exhibition at Stockholm; International, Montreal; International Industrial and Fine Arts, Nashville (Tennessee). 1898:—Universal, Amsterdam; Exhibition at St. Paul, Brazil; Exhibition at Turin. 1899:—Exhibition at Adelaide. 1900:—Universal Exhibition at Paris. —Industries and Iron.

ABOUT 400,000 hectares (nearly 1,000,000 acres) of land in the valley of the Rio Sonora, State of Sonora, will be put under irrigation by the construction of the irrigating works near Hermosillo, the contract for which was recently let. The plant will be completed in three years, though water will be supplied to a portion of the land in twelve months from the time work begins.

Electrical Progress.

Operation of the Nantasket Beach Train by Electricity.

The favor with which the electric operation of the Nantasket Beach branch of the New York, New Haven & Hartford Railroad has met with from the visitors to Boston's pleasure resort at Nantasket Beach is phenomenal. It has served to confirm the predictions of the engineers of the railroad as well as of the General Electric Company, whose system was adopted. Given a comfortably seated car, open to all the cooling breezes on a hot day, unafflicted by the plague of dust from the dry track or cinders and smoke from the steam locomotive, and the prophecy that the public would avail itself largely of the privilege of riding was not difficult of realization.

Electric operation of the Nantasket Beach branch was in June last extended as far east as Weymouth, in the direction of Boston, on the main line of the Old Colony Dominion. On the new line, however, the overhead conductor is not used. A third rail laid between the rails of the surface track takes the place of the trolley wire, and although this is the first instance of a third rail electrical conductor being laid between the tracks of a steam railroad, some measure of failure might consequently be looked for. However, the cars have been regularly operated over it between the regular steam trains without hitch or difficulty. In the operation of the cars the change from the overhead trolley to the third rail source of power is made imperceptible. When the car approaches the end of the trolley wire a knife switch under the hood of the car is closed, connecting the shoe beneath the car with the motor circuit, the trolley slides off the overhead wire and is hooked down, the car meanwhile continuing on its journey. On the day of the inauguration of the third rail section several high speed spurts were made, and these have frequently been exceeded in the actual service.

The illustration shows the car house of the first electrical division of the New York, New Haven & Hartford Railroad, adjoining power house No. 1, a corner of which is shown to the left. The car house has four pits, over which the cars may be run for examination of the motors, and is fully equipped with all the necessary appliances.

CAR HOUSE AND TRAINS ON THE ELECTRICAL DIVISION OF THE N. Y., N. H. & H. RAILROAD.

Path for the Return Current.

The practice heretofore in electrical railroad building has been to furnish no definite adequate path for the return current. They have relied in the main on what is vaguely known as the "earth" return. This term, "earth return," as it is known in the cities, should be called the "water-pipe return," for the water pipes have been used right along in all the cities where electrical railroads have been introduced. In some cases the use has been intentional, and in others unintentional, but it has been done. The reason is because the water pipe offers a better path for the electricity than the earth does.

The current always follows the easiest path. The result of this loose use of the earth and water pipes has been the deterioration of the water pipes and gas pipes, causing leakage and making frequent repairs necessary. It has weakened the pipes till they burst. This has driven electrical engineers to devising methods of confining the current to the rails by making the rails an ample path for the current and insulating them from the surrounding earth and pipes. It is not now necessary in order to have a good electric road to connect with the water pipes. The whole aim of advanced electrical engineers has been to avoid using them, and they have lately succeeded.

A striking difference in the methods adopted on two electric roads in San Francisco and those under construction by the Market Street Railroad Company is that the former, intentionally or unintentionally, use the water-pipe return, as an auxiliary to their said return, whereas the latter will confine the current to the rails.

The current is confined to the rails in two ways: First, by bonding or connecting the abutting ends of the rails by large copper wires rigidly fitted into holes on each side. These wires are equal to or larger in size than the combined overhead wires. Second, by insulating the rails from the earth and the water pipes by 6 inches of broken stone under an 8-inch wooden tie.

It is well known that when an electric car is derailed, if the wheels are within even a few inches of the rails and wet earth intervenes, it is impossible to force enough electricity through this few inches of earth to move the car. Even the lights will have been suppressed, and remain out. When a few inches of moist earth serve to so completely shut out the current, it is clear that 6 inches of broken rock, 8 inches of wood, and probably 2 feet of intervening soil, will be ample to keep the current away from the water pipes.

A strange thing to most people will be the statement that the managers of earlier electric lines, in order to strengthen inadequate rail bonding, have dug holes in the ground, at intervals of, say, 1000 feet, and put in old worn-out car wheels, pieces of rails, or iron plates to connect the rails with the earth, which really amounts, in a city, to connecting with the water pipes.

Scientific Progress.

Recent Archaeological Discoveries.

A remarkable discovery was recently made in the Assiot necropolis in Egypt. Among the objects found was a whole company of wooden soldiers 15 inches in height. The soldiers carry lances and give a good idea of their equipment in the Pharaohs' time.

Recent investigations not far from Sebastopol have yielded some interesting finds. Near the French cemetery the discovery was made of what must have been the site of a very large Byzantine city, and objects of classical Greek art of great beauty have been brought to light.

The excavations among the ancient Greek ruins at Eretria have been carried on some years by the American School of Classical Studies at Athens. The gymnasium and other buildings which have been uncovered are probably part of the buildings on each side of the ancient street laid bare last year between the theater and the naval school of King Otho.

In the course of further excavations in the island of Melos, by the director and students of the British School of Athens, one of the most important discoveries has been that of a mosaic which is believed to be the finest yet found in Greece. More recently the excavators have come upon a series of graves of the sixth century B. C., in one of which was found a number of ornaments in gold and silver. In another (Roman) tomb was found a series of gold leaves from a wreath, and a gold ring was a fine subject in cameo.

The trained workmen who have for some years been making excavations in order to explore the remains of the Roman city of Calleva, at Silchester, have very recently opened up several additional buildings, one of them with a very interesting hypocaust showing some unusual features, while others are believed to have been used as dyers' workshops. There was also found an earthenware pot containing 253 silver denarii, ranging in date from B. C. 40 to A. D. 211, though there have been also many objects in gold, bronze, metal, bone and glass, much pottery, and a fine slab of Purbeck marble. The previous discovery of numerous wells, stone hand mills, furnaces, etc., seems, in connection with the buildings disclosed by the latest excavations, to leave no doubt that extensive dye works were once carried on in the buried city.

At a recent meeting in London of the Egypt Exploration Fund, D. G. Hogarth, the well-known explorer, said, that the excavations of last season had convinced him that there was

no hope of the preservation of any of the contents of the libraries of Alexandria within the city. Not only has the subsoil water risen generally above the Roman level, but, even where the water does not reach, there is a great deal of damp sucked up by capillary attraction, so that there is no chance, even if any papyri were found in Alexandria, of their being legible at the present day. One of the main reasons for stopping the work at Alexandria was that even below the water level everything was found to be in the utmost state of ruin. After the Arab conquest, any of the books which remained would naturally drift from Alexandria to Cairo. It is not, however, in the rainy delta that they must be sought, he declared, but higher up the Nile, where man has been less active. It is only to Egypt, he said, that we can look with any confidence, to the Fayum and to the dry upper valley of the Nile, for the best classics —perhaps for Sappho and Menander—and for the missing early Christian literature.—Scientific American.

IN the mining and foundry district of Bochum, Prussia, Dr. Nieden reports having treated during the years 1885–94, 5443 patients engaged in such occupations, of whom more than 68 per cent were cases of injury to the eye in their calling, iron and foundry workers showing a large predominance in this respect over miners. Of 3723 iron and foundry workers treated for eye injuries, 2805 were for the left eye and only 1638 for the right, or a relative proportion of 56 to 44; and, as a similar proportion held good in each separate year, the conclusion arrived at is that in such work the danger to the left eye is really greater than that to the right. Even more marked, in fact, was the proportion in respect to the severe cases, the left eye being quite lost in seventeen cases, the right only in seven. It is urged, therefore, that in iron workers the loss of the right eye should be calculated as the more serious, inasmuch as the individual then runs a greater risk of injuring the remaining eye than when he has lost the left.

AT the Blue Hill observatory near Boston, Mass., on August 20, Charles H. Lamson, using a cellular or box kite, built somewhat on the Hargraves model, succeeded in lifting a weight of 150 pounds, designed to represent a man, to a height, as reported, of 600 feet. The kite was started from the ground with a length of 400 feet of rope paid out. It then, as released, rose steadily without any jerking until, as the altitude of 600 feet was reached, the rope parted. The kite floated off about half a mile down the wind, and is said to have reached the surface so gently that, had a real man been carried by it, he would not have been injured. The kite includes a number of features that distinguish it from any other. The relations of the cells to each other can be changed by manipulating a lever, and if a passenger were carried by it, this and other means enable him to materially change the course and the position of the kite and also to direct its descent.

DAMAGE by lightning is unmistakably increasing, according to the director of the statistical office of Berlin. Various causes are assigned, such as the employment of electricity in various industries, the continual change of form of the earth's surface by deforestation, drainage, etc., and the impurities introduced into the atmosphere by the growing consumption of coal. Professor Von Bezold some time ago showed that for Bavaria the fires due to lightning increased from a yearly average of 32 in 1833, to 1843 to 132 in 1880 to 1882, while the number of persons struck by lightning and of those killed rose from 134 and 73 respectively in 1855 to 186 and 161 in 1885. An interesting fact noted is that persons struck generally perceive neither lightning nor thunder, but receive the impression of being enveloped by fire.

Mechanical Progress.

Force of Water Pressure.

A crushed mass of cast metal now lying in a scrap yard at Pittsburg demonstrates the tremendous pressure of water at a great depth. It was constructed for a diving bell, and was intended for use in Lake Michigan. As originally constructed, it was a cube about six feet square, tapering slightly at both ends. The material was phosphor bronze, five-eighths of an inch thick. Each plate was cast with a flange and they were bolted together, the bolts being placed as closely together as was consistent with strength. The side plates were further strengthened by ribs an inch thick and two inches wide, and the entire structure was strongly braced. The windows, intended to be used as outlooks by the divers inside, were three inches square, fortified with iron bars and set with glass plates an inch thick. The entire weight of the bell was 23,000 pounds. When completed, it was sent to Milwaukee and towed out into the lake about twelve miles, where there was over 200 feet of water, and was sent down for a test.

The manufacturer of the bell was so confident of its strength that he wanted to go down in it on the test trip. It was well he did not. When it had reached a depth of about 200 feet, strong timbers which had been attached to it came to the surface in a splintered condition. Suspecting an accident, the bell was hauled up and found to be crushed into a shapeless mass. The inch-thick plate glass bull's eyes were pulverized and the entire body of the bell forced inward until none of its original outlines remained. On a basis of 200 feet depth, the pressure that crushed this seemingly invulnerable structure was 86.8 pounds per square inch, or 353,924 pounds to each side of six feet square. The total pressure, therefore, on the cube was 2,723,548 pounds, or 1361.7 tons.—The Foundry.

ONE of the earliest necessities of the primitive founder was a form of apparatus for handling the materials, and crude appliances for this purpose are known to have existed from a very early period. It may, however, surprise those who have not investigated the subject historically to learn that records are extant showing that even the Egyptians possessed elaborately constructed derricks and other hoisting appliances, says A. E. Outerbridge Jr. A gentleman who recently returned from an extended tour in that land of antiquity informed me that one of the most interesting places he visited while in Egypt was a large chamber or vault in the interior of one of the pyramids which contained the sarcophagus of the king who caused its construction. The walls of this room were lined with large slabs of stone upon which were carved, in low relief, hundreds of figures, illustrating the method of constructing the pyramid, including the quarrying of the stone. The representations of derricks and other apparatus, with winches, ropes, etc., for hoisting and moving the large stones resembled many of the appliances for similar uses which may be seen in parts of Europe even at this day.

THE British Board of Trade publishes the following table of exports of iron and steel products to the United States:

	JULY.		SEVEN MONTHS.	
	1895.	*1896.*	*1895.*	*1896.*
	Tons.	*Tons.*	*Tons.*	*Tons.*
Pig iron	2,484	2,423	9 459	22,940
Bar, angle and bolt iron	117	167	783	1,109
Railroad iron and steel	.....	32	3,972	8,439
Hoops, sheets and boiler plates	718	2,022	1,164	4,136
Tin plates and sheets	16,445	13,930	124,839	73,552
Old iron	104	370	458	747
Steel, unwrought	1,293	1,062	8,672	8,834
Wire, iron and steel	353	116	3,367	1,864
Black plate for tinning	1,383	72	6,140	2,356
Totals	22,897	20,194	158,884	123,977

Taking exports during July, 1896, in comparison with those for July, 1895, there is a decrease of 10 per cent. A remarkable drop, and one indicating the development of the tin plate industry in this country, is shown in exports of black plate for tinning. The amount exported last month was 72 tons, but the total for July, 1895, was 1383 tons. Comparing the total exports during the seven months of this year with those of a similar period in 1895, we find a decrease of 21 per cent. This decrease is caused by the falling off in only three articles—tin plates, wire and black plates for tinning. The first, of course, was the largest. The drop in black plate exports was 62 per cent and the decrease in wire was 44 per cent. On the other hand, some lines show largely increased exports from Great Britain to the United States. Pig iron shows an increase of 58 per cent and bar iron exports are 41 per cent greater. An increase of 112 per cent is shown in steel rail exports, while hoops, sheets and boiler plates show an increase of 246 per cent. Scrap iron exports increased 66 per cent. In this period the increase in exports of black plate for tinning was 62 per cent, while wire shows a gain of about 44 per cent.

CHLORATE OF POTASH works are about to start up at Niagara, N. Y. This is the first plant of the kind in the United States, and it is predicted that it will revolutionize several branches of the chemical industry.

Practical Information.

Uncle Sam's Warships.

Furniture and supplies for Uncle Sam's new war vessels cost money. To fit out one of these ships for a cruise is a bigger job than equipping a first-class hotel. Here is a floating fortress as long as two city blocks, with all modern conveniences and complete restaurant facilities, lighted throughout by electricity—a gigantic fighting machine and military barracks combined. Her steel walls, bristling with guns, shelter a small army of men. The New York, for example, has a crew numbering 455, besides 40 marines and 44 officers. To feed them all for a twelve-month at the Government's rate of allowance costs $60,000.

On going into commission such a ship must be furnished throughout, from the kitchen, which is as complete as that of a great city hostelry, to the captain's cabin. She carries large stocks of stationery, hardware and apothecaries' goods, and is provided with tools for all sorts of trades. Everything conceivable that may be needed for purposes of war and peace is supplied, because on the high seas no shops or factories are accessible. Usually the vessel is provisioned for only three months, because there is no room to stow more. The rations are purchased by the Navy Department and comprise such necessities as hard bread, cornmeal, oatmeal, hominy, flour, salt pork, beans, peas, rice, preserved meats, butter, coffee and tea.

Every man in the navy, from the last boy shipped up to the admiral, has an allowance of 30 cents a day for rations, which he may draw either in food or in money. The paymaster of the ship has charge of all the provisions, which are dealt out by his "yeoman," who is in turn assisted by the jack-o'-dust. The person last named attends to opening the barrels and packages. Coffee and sugar are served out once in ten days, flour every four days and meats daily. While in port fresh provisions are furnished, each man receiving 1 pound of fresh bread, 1½ pounds of fresh meat and 1 pound of fresh vegetables per diem. These take the place of the ordinary rations, only tea and coffee being provided in addition. The allowance is at all times so liberal that the enlisted men cannot possibly consume the whole of it, so they take part of it in cash.

THE following table shows the gas prices being paid in a number of cities in this country:

CITIES.	Illuminating gas, per 1000 cubic feet	Illuminating gas, for heat, per 1000 cubic feet	Natural gas, per 1000 cubic feet
Cincinnati	$1.00	$1.00	.....
Cleveland	.80	.80	.....
Toledo	.80	.80	.20
St. Louis	.90	.80	.....
Canisteo, N. Y.	.50	.25	.....
Dayton, O.	1.00	1.00	.25
Buffalo, N. Y.	1.00	1.00	.25
Chicago (Hyde Park)	1.00	.72	.....
Detroit, Mich	1.00	.86	.30
Springfield, O.	.....	.....	.25
Indianapolis	.....	.....	.07
San Francisco	1.75	.....	.....

A WAY to test linen, by means of which the introduction of cotton among the linen threads may be detected, is to cut off a small piece of the material, to unravel the threads, and then to examine them under a strong magnifying glass. The characteristics of flax-threads are very marked. They are in the form of cylindrical stalks, divided at intervals by knots, in the same way as bamboo or sugarcane stalks. Cotton threads are long and flattened like ribbon, waved, twisted in spirals, and granulated on the surface.

LAST season the Manchester ship canal handled 65,510 bales of Egyptian and 120,713 bales of American cotton. The tonnage of American cotton this year will be larger, and a British paper states that arrangements have been made for frequent sailings of steamers direct from New Orleans and Galveston to Manchester.

CALIFORNIA MINES AND MINERS.*

Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

TUOLUMNE COUNTY—Continued.

NAME OF MINE	Character of Mine	No. of Men Employed	Location.	Name of Superintendent or Agent.	Address.
North Extension	Gold.	.....	2¼ m NW of Table Mtn.	R. Chute, Owner	405 Front St., S. F.
Neversweat	"	1	1 m NE of Priests	Jas. Ballentine, Own.	Big Oak Flat
Nonpareil	"	.....	1½ m NW of Groveland	Jos. Reggie, Own.	Groveland
North Star	"	5	1½ m NW of Jacksonville	C. C. Stout, Supt.	Jacksonville
Ophir	"	6	5 m N of Gibsonville	W. E. Bainbridge, O'n	Gibsonville
Ohio	"	.....	3 m N of Soulsbyville	P. B. Bacon, Own.	Sonora
O. K.	"	.....	2 m NW of Table Mtn.	R. Chute, Own.	405 Front St., S. F.
Old Tuolumne	"	.....	3 m NE of Columbia	.....	.....
Ophir	"	.....	1 m NW of Big Oak Flat	James Bros., Own.	Groveland
Ophir	"	8	Jamestown	Shafer & Rapp	Jamestown
Harris & Oliver	"	.....	Jamestown	Shafer & Rapp	Jamestown
Orcutt	"	....	¼ m NW of Jacksonville	A. L. Orcutt, Own.	Jacksonville
Pena Blanca	"	.....	1½ m W of Rawhide	J. L. Ross et al, Own.	Redwood
Patterson	"	.....	½ m W of Tuttletown	Joe Podesta, Own.	Tuttletown
Pride of Tuolumne	"	.....	1 m W of Tuttletown	Mrs. Rickert, Own.	Rawhide
Pine Ridge	"	.....	2 m W of Jamestown	E. A. Stent et al, Own	Stent
Pacific	"	.....	½ m N of Quartz Mtn.	O. S. Cressy, Own.	Stent
Plumas Eureka	"	50	Johnsville	— Johns, Supt.	Johnsville
Plumas Imperial	"	10	4 m W of Quincy	C. D. Hazard, Own.	Quincy
Puerto Fino	"	.....	½ m NW of Carters	Wm. Sharwood, Own.	Soulsbyville
Plow Boy	"	.....	10 m NE of Sonora	Baker & Hamilton, O'n	S. F.
Philadelphia Mine	"	4	2 m S of Summerville	W. H. McClintock, Sup	Sonora
Philadelphia	"	.....	10 m NE of Columbia	W. H. Sharp & Co., Own	S. F.
Philadelphia Diggin's	"	.....	10 m NE of Columbia	W. H. Sharp & Co., Own	S. F.
Pine Log	"	1	3 m N of Columbia	Aug. Wiederind, Own	Columbia
Page	"	6	1 m NE of Sonora	Louis Page, Supt.	Sonora
Parrott	"	.....	3 m N of Soulsbyville	W. H. Barron, Own.	Soulsbyville
Pennsylvania	"	.....	½ m N of Carters	Fred Sutton et al, Own	Sonora
Pennsylvania	"	.....	Soulsbyville	Wm. Sharwood, Own.	Soulsbyville
Piute	"	.....	4 m NE of Carters	C. H. Haslam, Own.	Sonora

TUOLUMNE COUNTY — Continued.

NAME OF MINE.	Character of Mine.	No. of Men Employed.	Location.	Name of Superintendent or Agent.	Address.
Platt & Gilson	Gold.		Soulsbyville	Wm. Sharwood, Owner	Soulsbyville
Quincy	"	20	3 m W of Quincy	Incorporated Co	
Rhode Island Mine	"	4	2 m S of Summerville	W. H. McClintock, Sup	Sonora
Ritchie	"	2	½ m W of Tuttletown	W. F. Nevills, Own	Tuttletown
Ross	"		1½ m W of Tuttletown	Mrs. Rickert, Own	Rawhide
Rickert Homestake	"		2 m W of Tuttletown	Edwin Rickert, Own	Tuttletown
Richards, ty Summers	"		¼ m S of Summerville	W. S. Chapman, Own	
Rappahannock	"	13	3¼ m SW of Sonora	R. Chute, Own	405 Front St, S. F.
Rising Sun	"		9 m E of Sonora	Sonora Ex M Co., O'n	Sonora
Rawhide No. 2	"		Rawhide	Hayward & Co., Own	S. F.
Rawhide	"	88	3¼ m SW of Sonora	Nevills, Martin & Co., Own; WA Nevills, Sup	Jamestown
Riverside	"		11 m N of Soulsbyville	Williams Bros., Own	San Jose
Republican	"		Jacksonville	W. Lemmon, Own	Jacksonville
Royal Granite	"	2	1¼ m S of Priests Hotel	Lumsen & Price, Own	
Sarah Francis	"		1½ m W of Rawhide	J. L. Ross et al, Own	Redwood
Sailor Boy	"	1	13 m N of Columbia	John Canyon, Own	Murphys
Sawyer Mint	"	4	Tuttletown	Mrs. VanSawyer, Own	Tuttletown
Stenchfield	"		1½ m NW of Tuttletown	War. Stenchfield, Own	Tuttletown
Swell	"	2	13 m N of Columbia	Col. Dorsey, Own	S. F.
Street Mine	"		¼ m N of Tuttletown	Fred Sutton, Own	Sonora
Spring Gulch	"		11 m SE of Sonora	W. Marshall, Own	Sonora
Skinner	"		1 m S of Jacksonville	Oliver & Mariman, O'n	Sonora
Santa Isabel	"	60	Quartz Mountain	W. E. Holmes, Supt	Stent
Sweeny	"		¼ m N of Quartz Mtn	Howard Preston, Own	
Star	"	18	6 m NE of Columbia	Rose Creek M. Co, O'n Geo. Blake, Supt.	Columbia
Santa Maria	"		20 m SE of Groveland	John Neale, Own	Sonora
San Guiseppe	"	7	¼ m NW of Sonora	Fred Sutton, Own.; W. G. Wharf, Supt.	Sonora
Santiago	"	6	½ m NW of Sonora	J. T. Faxon, Own	Sonora
Sell	"	8	¾ m E of Sonora	Leased to J. Baelisch	Sonora
Seminole	"	18	1½ m SW of Carters	Col. J. T. Cole, Supt	Carters
Shanghai	"	5	3 m E of Columbia	Phillips Morgan, Own	Columbia
Soulsby	"		Soulsbyville	Wm. Sharwood, Own	Soulsbyville
Stanley	"		1 m E of Jacksonville	Thos. White et al, Own	Sonora
Stewart	"	3	½ m NE of Sonora	— Stewart et al, Own	Sonora
Stockton	"	3	½ m SE of Sonora	Lunt & Oaks, Own	Sonora
Sugarman	"	1	1 m NE of Sonora	John Neale, Own	Sonora
Shawmut	"	21	2¼ m NW of Jacksonville	A. Halsey, Supt	Jacksonville
Silken	"		1 m NE of Priests	C. P. Hall, Own	Big Oak Flat
Silver Star	"		¾ m N of Jacksonville	J. M. Russell et al, Own	Jacksonville
Silver Star	"		2 m N of Groveland	H. Perkin, Own	Big Oak Flat
Star	"	17	18 m N of Sonora	F. W. Ullmans, Supt	Columbia
Sullivan	"	2	4 m N of Groveland	Sullivan Bros., Own	Groveland
Toledo	"		1½ m W of Tuttletown	W. B. Clement, Own	Tuttletown
Trio	"		1¼ m NW of Jamestown	A. Hayward, Own	S. F.
Tarantula	"		2 m NW of Table Mtn	E. C. Frisbee, Own	Sonora
Thompson	"	2	½ m S of Big Oak Flat	Hall & Harten, Les's	Big Oak Flat
Tuolumne Ditch	Water.	4	Tuolumne County	Tuol. County Ditch Co	Sonora
Utopia	Gold.		1¼ m SW of Tuttletown	Mrs. Rickert, Own	Rawhide
Urquhart (13 claims)	"		6 m NE of Groveland	Jos. Urquhart, Own	Groveland
Valparaiso	"	6	1 m N of Tuttletown	C. J. Pillsbury, Supt	Tuttletown
Vulture (Donovan)	"		1 m N of Quartz Mountain	Mrs. Donovan, Own	Jamestown
Virginia	"		12 m SE of Sonora	Fred Wenzel, Own	Sonora
Virginia	"		17 m E of Sonora	Con. Garfield Virginia M. Co., Own	J. N. Purdy, Secy, Sonora
Virginia	"		6 m N of Groveland	H. Argall, Own	Groveland
Vorcester Mine	"	1	¼ m N of Tuttletown	H. O. Gibson, Own	Tuttletown
Wheal Ruff	"		1 m W of Soulsbyville	T. Richards et al, Own	Sonora
Wheal Perrin	"		Soulsbyville	Wm. Gasson, Own	Sonora
White Oak	"		½ m W of Soulsbyville	Scott, Dowe & Co., Own	Sonora
Whitts Mine	"		1 m W of Soulsbyville	Thos. Whitts, Own	Sonora
Winchester	"		¼ m N of Columbia	Julia Winchester, Own	Columbia
Winnie	"	3	1¾ m W of Quartz Mtn	Rapp & Schaffer, Own	Crocker Bld, S. F.
Worcester	"		1½ m SE of Carters	T. G. Winwood et al, On	Sonora
Watson	"	2	5 m NE of Groveland	Edw. Watson, Own	Groveland
Wheeler	"		½ m NE of Big Oak Flat	O. Fisk, Own	Coulterville
Wild Cat	"		½ m W of Groveland	Harper & Hartin, Own	Big Oak Flat
Willietta	"		1 m SE of Jacksonville	Wm. S. Sharwood, Secy	Soulsbyville
Wooten	"		2 m N of Groveland	S. F. Longfellow, Own	Big Oak Flat
Yancy	"	2	1 m NE of Sonora	— Yancy, Own	Sonora
Young America	"		1¾ m SW of Carters	J. L. Coles, Supt	Carters

TULARE COUNTY.

Alila Well	Water.		Alila	Alila Land Co	Alila
Ante Up	Gold.		3 m NE of White River	Chas. Newley, Owner	White River
Agnes Fletcher	"	2	1 m E of Yokohl	Chas. Lindsay, Own	Visalia
Adams Flat	"	2	5 m S of Auckland	A. B. Brown, Own	Auckland
Barton	"	4	2¼ m N of Auckland	W. D. Barton, Own	Auckland
Black Prince	Silver	2	6 m E of Camp Badger	E. Walters, Own	Camp Badger
Billy Brown	Gold.	3	8 m NE of Porterville	Hocket Bros., Own	Porterville
Blue Bird	Silver.	2	6 m E of Camp Badger	Kirkland Bros., Own	Auckland
Bole Allen	Gold.	2	5 m SW of White River	P. C. Montgomery, Own	Porterville
Bald Mountain	"	5	1½ m E of White River	Nelson Hallock, Own	White River
Coarse Gold	"	2	1½ m S of White River	J. O. Culver, Own	White River
Clara Gibbons	"	3	3 m SE of White River	C. H. Gibbons, Own	White River
Drummond	"	3	1¼ m S of White River	Nelson Hallock, Own	White River
Domingo	Silver.		6 m E of Camp Badger	E. Walters, Own	Camp Badger
Eclipse No. 2	Gold.	4	2½ m SW of White River	Nelson Hallock, Own	White River
Enterprise	"	2	6 m SW of White River	G. N. G. Smith, Own	White River
Escholzia	"		5 m E of Auckland	O. Barton, Own	Auckland
Griffith & Owens	"		3¼ m E of Exeter	Griffith & Owens, Own	Exeter
Goodenough	"	2	3 m NE of White River	Owen Peters, Own	White River
Gray Eagle	Silver.	2	6 m E of Camp Badger	W. Hart, Own	Camp Badger
Homestake	Gold.		2 m SW of White River	D. W. Grover, Own	Santa Cruz
Hard Times	"		3 m NE of White River	J. Jacombs, Own	White River
Hart	Silver.		6 m E of Camp Badger	W. Hart, Own	Camp Badger
Itgens Well	Water.		15 m SW of Tulare	R. C. Itgen, Own	Tulare
Keep	Gold.		¼ m SE of White River	M. A. Harris, Own	White River
Last Chance	"		2 m W of White River	Nelson Hallock, Own	White River
Monarch	"		2 m NE of Milo	J. Goldstein et al, Own	Visalia
Mammoth	"		20 m NE of Milo	J. Goldstein et al, Own	Visalia
Mineral King	"		60 m NE of Visalia	J. Goldstein et al, Own	Visalia
Mammoth	"		1½ m SW of Tulare	G. W. Grover et al, Own	Visalia
Otter	"		1¼ m S of White River	J. W. Beaver, Own	White River
Oliver Twist	"		1 m NE of White River	O. N. Peters, Own	White River
Old Soldier	"		5 m N of Auckland	Deserted	
Page	"		7 m NE of Visalia	J. Prathers, Own	Visalia
Plucha and Bulger	"		13 m E of Visalia	J. Edwards, Own	Visalia
Royal	"	2	5 m SW of White River	Richard Roberts, Own	White River
Richelieu	"	7	1½ m SE of White River	Nelson Hallock, Own	White River
Simmons	"	2	2 m E of White River	J. E. Dunlap, Own	White River
Stencil	"	2	1¼ W of White River	Jno. B. Flaugher, Own	White River
Tulare Irrigation Co.	Water.		Near Tulare	E. Oakford	Tulare
Way Up	Gold.		20 m NE of Camp Badger	E. S. Balam, Own	Camp Badger

TEHAMA COUNTY.

Sierra Flume	Water.		Red Bluff	Frank Boole, Supt	Red Bluff
Tuscan Springs	"		8 m NE of Red Bluff	E B Walbridge, Owner	Tuscan Springs
Tehama Chromic Iron	"		30 m SW of Red Bluff	P. C. Crambaugh, Supt	Red Bluff
Tehama C. D. Co	"	40	28 m W of Red Bluff	Tehama Chrome Co	Red Bluff
Tuscan Mineral Spgs	"	7	8 m NE of Red Bluff	E. W. Walbridge, Own	Tuscan P. O.
Vina Canal	Water.		Vina	T. J. Swing, Supt	Vina

VENTURA COUNTY.

Anacopa Mine	Gold.			Jno. P. Resseigh, Supt	Anacopa Island
Bunker Hill	"		15 m W of Gorman Station	Geo Haylock	Gorman Station
Frazier	"	7	6 m W of Gorman Station	W. W. James, Supt	Gorman Station
Old Esperanza	"	3	18 m W of Gorman Station	John Foley, Owner	Gorman Station
Santa Paula S. Sp'gs			20 m NE of Ventura	A. H. McCutchen	Santa Paula
Sespe Hot Springs			35 m N W of Buenaventura	W. S. Gont	

YUBA COUNTY.

Brown's Val. I'g'n Canl	Water.		Brown's Valley	— Hibbert, Supt	Brown's Valley
Brown's, J., Mine		2	¾ m NE of Smartsville	J. Brown, Owner	Smartsville
Cleopatra	Gold.		½ m NE of Smartsville	— Halstead, Supt	Smartsville
Excelsior W & M'ng Co				— Halstead, Supt	Smartsville
Hawkeye	Gold.	3	Brown's Valley	Barton Bros., Own	Brown's Valley
John Dempsey	Clay & cop. p't		18 m SW of Wheatland	Jno. Dempsey, Own	Wheatland
Marysville W. Co. Well	Water.	2	Marysville	L. C. Williams, Supt	Marysville
Marc Anthony	Gold.		¾ m NE of Timbuctoo	— Harvey, Supt	Smartsville
New Era Gravel Mine	"	4	1½ m SE of Brown's Val'y	Incorporated Co., S. F.	J. Toplitz, Secy, 330 Pine, S. F.
Old Flag Mine	"	26	¾ m N of Brown's Valley	A. H. Walrath, Supt	Brown's Valley
The Boa Mine	"	4	Timbuctoo	G. E. Mowatt, Supt	Smartsville
The Dannebrog	"	4	Brown's Valley	J. C. Campbell, Supt	Brownsville

YOLO COUNTY.

NAME OF MINE.	Character of Mine.	No. of Men Employed.	Location.	Name of Superintendent or Agent.	Address.
Adams Ditch	Water		Near Capay	D. Q. Adams Estate	Yolo
Capay Ditch	"		Capay	G. W. Stevens, Secy	Woodland
Capay Valley Ditch	"		Upper Capay Valley	Spring Valley W. Co	S. F.
Dinsdale Artesian			2 m S of Woodland	John Dinsdale, Owner	Woodladd
Putah Creek	Quarry		9 m W of Winters	B. Bertheirt, Supt	Winters
Woodland Irrig. Canal	Water.		Near Woodland	C. A. Brown, Secy	Woodland

SONOMA COUNTY.

Black Bear	Q. Silv.		2 m E of Geysers	Black Bear M. Co.	Calistoga
Boca	Basalt	4	1½ m E of Glen Ellen	Boca Bros., Owner	Glen Ellen
Brown & Smith Co	Gold.		2½ m N of Calistoga	Dr. W. D. Smith, Own	Calistoga
Barnes	Quarry	6	2 m E of Penn Grove	A. Barnes, Own	Penn Grove
Burg	"		Mellitta	— Burg, Own	Mellitta
Cinnabar King	Q. Silv.		12 m from Geysers	Edw. White, Supt	Healdsburg
Clute	Quarry	30	Santa Rosa	A. H. Clute, Own	Santa Rosa
Cooney	"	2	5 m NE of Petaluma	P. Cooney, Own	Petaluma
Crowin	"	4	1½ m S of Petaluma	P. Crowin, Own	Petaluma
Davis	"	3	2 m E of Penn Grove	E. W. Davis, Own	Penn Grove
Dixon	"	2	7 m NE of Petaluma	D. S. Dixon, Own	Petaluma
Elliott	"	50	Near Santa Rosa	McD Elliott, Own	Santa Rosa
Great Eastern	Q. Silv.	35	4 m N of Guerneville	Albert Abbey, Supt	41 Nev. Block, S.F.
Gray	Onyx.		16 m W of Healdsburg	Geo. Madeira, Own	Healdsburg
Harney	Quarry	6	Mellitta	W. H. Harney, Own	Santa Rosa
Harding Pav'g Bl'cks	"	8	5 m E of Petaluma	Lester Harding, Own	Santa Rosa
Indian Met'l'c Paint Co		6	7½ m SW of Healdsburg	T S Merchant et al, O'n	Healdsburg
Landgren		5	Mellitta	Fred Langren, Own	Santa Rosa
Lynch	Quarry	4	6 m E of Petaluma	John Lynch, Own	Petaluma
Missouri	Q. Silv.	1	2 m E of Geysers	— Marvin, Own	Geyser Springs
Manuel	"	21	At Kenwood	A. Manuel, Own	Kenwood
Marmora	"	8	Kenwood	— Marmora, Own	Kenwood
Marvin	Quarry		Kenwood	— Marvin, Own	Kenwood
McDonald	"	18	3 m E of Santa Rosa	W. J. McDonald, Own	Santa Rosa
Pinelli Paving Blocks		20	3 m E of Santa Rosa	V. Pinelli	Santa Rosa
Pinelli Paving Blocks			1 m W of Sonoma	V. Pinelli	Santa Rosa
Petaluma Paving Co		21	½ m S of Petaluma	Petaluma Pav. Co, O'n	Petaluma
Rattlesnake	Q Silv.		3 m S of Geysers	Parrott Estate, Own	S. F.
Red Cloud	"		5 m SE of Geysers	R. Swift, Own	Healdsburg
Rose	Quarry	2	1½ m E of Sonoma	David Rose, Own	Calistoga
Roberts	"	5	2 m E of Penn Grove	L. Roberts, Own	Penn Grove
Shaw (Manganese)			8 m W of Cloverdale	J E. Shaw, Own	Cloverdale
Silver Queen	Gold.	2	5 m W of Passadero	Isaac Gray, Own	Healdsburg
Sonoma	Q. Silv.		5 m SE of Geysers	Mrs. Gen. Dodge, Own	S. F.
Schocken Pav'g Bl'cks		20	At Sonoma	G. W. Schocken, Own	Sonoma
Thomason	Quarry		Mellitta		
Violette	"	15	Mellitta	T. Violette	Mellitta

MONO COUNTY.

Big Emma	G. Qtz.	2	2 m S of Lundy	Aug. Conks, Owner	Lundy
Black Rock Con, Black Rock and Contention	"		¼ m E of Bodie	J. S. Cain. A. McCone & J. W. Kelly, Own.	Bodie
Blanchard & Davidson Quarry	Lime.	3	6 m SE of Bodie	Blanchard & Davidson. Own.	Bodie
Bodie	G. Qtz.	18	¼ m E of Bodie	J. F. Parr, Supt	Bodie
Bodie Tunnel, Bechtel and Tioga	"	24	¼ m N of Bodie	J. S. Cain & A. McCone, Own; J. S. Cain, Mgr.	Bodie
Bonanza and Grand Prize	"	2	3 m W of Lundy	Jasper Parrett, Own.	Lundy
Borasca	Silver & lead.	3	4 m E of Benton	J. F. Millner, Own.	Benton
Boston Con	G. Qtz.	1	½ m S of Bodie	McInnis, Cameron & McDonald, Own.	Bodie
Bryant	"		3½ m S of Lundy	H. B. Cleaves, H. P. Merrill, C. A. Dyer & A. A. Travis, Own	Lundy
Bulwer	"	8	½ m E of Bodie	R. G. Brown, Supt	Bodie
Cal. Travertine	Trav'e.	10	1 m SE of Bridgeport	Cal. Travertine Co., Own; J. A. Brown, Agt.	Bridgeport
Comanche	Silver & lead.		2½ m E of Benton	J. F. Millner, Agt.	Benton
Con. Pacific	G. Qtz.		Bodie East	Est. Louis Lewis, Own	Bodie
Cornucopia	Silver & lead.	6	4 m E of Benton	N. Tobias, Adminis'tor J. F. Millner, Supt	Benton
Dauntless	G. Qtz.	2	2½ m W of Lundy	Farrington & Price, O'n	Lundy
Defiance	"		¼ m SE of Bodie	Lent & Etals, Own J. W. Kelly, Agt.	Bodie
Dogtown Placer Dig's	Placer	8	6 m S of Bridgeport	C. Anderson et al, Own	Bridgeport
Dunderberg	G. Qtz.	20	12 m S of Bridgeport	J. J. Kermeen, Supt	Bridgeport
Dudley	"	1	¼ m E of Bodie	J. W. Kelly, Own; P. Whelan, Lessee.	Bodie
Faulk	"	20	Mammoth	Col. L. S. Judd, Supt.	Mammoth
Harrison	"		2 m W of Lundy	A. L. Butterfield, J. M. Miller et al.	Lundy
Jackson & Lakeview	"	57	3 m S of Lundy	R. T. Pierce, Supt	Lundy
Josie Green and Colkemer	"		2 m W of Lundy	A. F. Hector, P. Regan et al.	Lundy
Jordan and Mammoth	"		Mammoth	Col. L. S. Judd, Own	Mammoth
Laura and Eureka	Silver.	6	3½ m E of Benton	Little Emily M&MCo, Own; J A Wilson, Supt	Benton
Mayflower	G. Qtz.		1 m S of Bodie	C Radcliffe, Own	Bodie
Mono	"	2	¼ m E of Bodie	J. W. Kelly, Supt	Bodie
Mono Lake Hydraul'c	Placer.	20	3 m NW of Mono Lake	R. N. Graves, Supt	Mono Lake
Montecito, Goleta and Sterling	Silver, copper & gold	5	Jordan	D. E. Jones, Supt	Jordan
New Standard	G. Qtz.	1	¼ m NE of Bod'e	J. S. Long, W. S. Lilien, & Mrs. Belmont, Own.	Bodie
Noonday & N. Noonday	"	1	½ m S of Bodie	Haggin & Tevis, Own. Reese & Graham, Les's	Bodie
Ontario Syn., inc. Erie and 9 other claims	"		3 m SW of Lundy	H. P. Cleaves, Own	Lund
Red Cloud	"		½ m S of Bodie	Haggin & Tevis, Own.	Bodi
South End Cyanide Co	Placer tailings	21	¼ m S of Bodie	Cain, McCone, Kelly, Radcliffe & Soderling, Own.	Bodie
Standard Con	G. Qtz.	100	¼ m E of Bodie	R. G. Brown, Mgr.	Bodie
Summit	"		½ m E of Bodie	R. G. Brown, Supt	Bodie
Syndicate	"	13	½ m NE of Bodie	Parr & Tyack, Les's. Syndicate M. Co., Own.	Bodie
University	"		½ m S of Bodie	W. A. Loose & R. A. Leale, Own	Bodie
Wolverine	"	2	2½ m W of Lundy	Lake Lundy G. M. Co., O'n; R G Montrose, Sup	Lundy
Ward	"	2	12 m S of Bridgeport	M. P. Hayes, Agt.	Bridgeport

MARIPOSA COUNTY — Additional.

Alice Clark Mine			1 m N of Coulterville	H. H. Clark, Owner	Coulterville
Champion			2 m N of Coulterville	N. C. Ray, Own	Coulterville
Coulterville Electric Power Plant			4 m S of Coulterville	H. H. Clark, Agt.	Coulterville
Horse Shoe Bend			3 m S of Coulterville	H. H. Clark, Own	Coulterville

NEVADA COUNTY — Additional.

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PLACER COUNTY — Additional.

Belmont Mine	Gold quartz.		1½ m W of Ophir in Ophir District.	D. Herbert Balch, Owner.	Room 80 S.P. Bldg. 4th & Townsend, SF

SHASTA COUNTY — Corrected.

Alvina	Gold.	2	4 m W of Horsetown	E. P. Connor, Owner	Redding
Andovina	"	2	3 m W of Redding	H. Christian & Mrs Dobelin, Own.	Redding
Bowery Bell	"	4	2½ m NE of Shasta	J. A. Kahney & J. G. Burgbacher, Own	Shasta
Bullard & Vandevear	"	7	12 m NW of Redding	Bullard & Vandevear, Own.	Shasta
Black & Brown Bear	"		6½ m W of Kennet	G. Bliss, Own	New York
Back Bone	"	2	4 m SW of Kennet	D McCarty et al, Own	Shasta
Balaklalla	"	6	1 m NW of Copley	Wm. Murray et al, Own	Shasta

—* Begun in issue of April 25, '96. (Concluded.)

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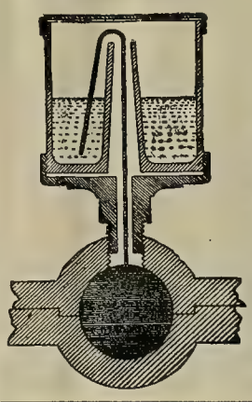

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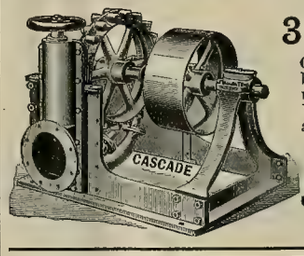

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Cycle Telegraphs In War.

Electrical communication plays an important part in the warfare of today, says the *Scientific American*. Special attention has been given by the Signal Corps of the United States Army to provisions for temporary telegraphic or telephonic communication. Flying telegraphic trains equipped with the most modern appliances are located at several Government stations in the West. Among pending experiments are those pertaining to insulators, wires, batteries and the most important one of the naked wire telephone.

The question of the reeling out and recovering of wire and outpost cable by bicycle, automatically, has come in for a considerable share of attention, and the results have been very satisfactory. The Signal Corps has now a bicycle equipped with an automatic reel that works perfectly. The attachment was made in San Antonio, Texas, under the supervision of its inventor, Captain R E. Thompson of the Signal Corps. The line was laid out and recovered at a moderate rate on the day of the first test. The speed was gradually increased, and it was found that the wire was paid out quickly. After dismounting for a moment to reverse the action, the officer began a return trip, keeping in the middle of the road and riding hard. The recovery was perfectly made, the wire being spooled evenly and the tension was at no time troublesome, although the course of the line was occasionally departed from by many feet, showing that the problem of compensating for increased speed of the recovery due to increasing bulk of the spool has been solved. The time occupied in running out and then picking up the reel of wire was two minutes, the reel holding about one-third of a mile of cable. Practical use has been made of the equipment in sending messages at other times than on the trial trip.

The cycle invented by Leo Kamm for laying telegraph wires for military purposes was employed at the recent Aldershot maneuvers in England. It consists of an ordinary pneumatic tired safety provided with two or three drums of wire of about four inches in diameter. On each of the spools is wound a twisted wire composed of fine steel thread. Each reel carries a mile of wire. The wire passes over a wheel connected with a telegraph receiver. As the rider travels the rotation of the bicycle unwinds the wire from the drum, leaving it on the ground. The bell rings before the wire is entirely paid out from the drum. When it is desired to send a message to the starting point, the rider dismounts and fixes in the ground an earth rod which is carried for that purpose. The apparatus for laying the wire weighs seven pounds, and each mile of wire weighs ten pounds.

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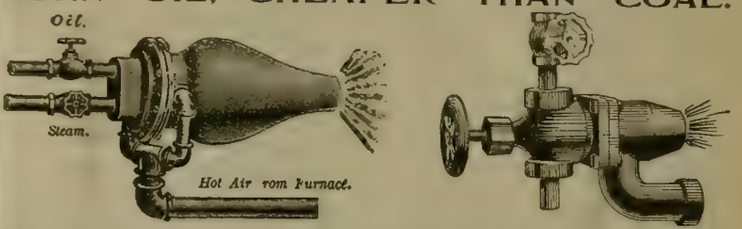

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Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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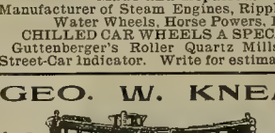

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Mining Summary.

CALIFORNIA.

Amador.

Ledger: Ross E. Browne, general manager of the Oneida, is at the property giving his attention to the construction of the plant. The shaft was down 287 feet September 1st.

The recent purchasers of the Smith interest in the Reward mine have been prospecting on a large, supposed to be barren, ledge with an open cut. They have encountered a streak of pay.

J. R. Smith and F. Walker, who have been taking out rock from the Blakely Ranch to be milled, uncovered a new ledge a few days ago which gives $25 to the ton.

At the Bellwether the three-compartment working shaft is down 135 feet.

Republican: The Jackson Gate mine shaft is now 300 feet deep.

At the Consolidated gold mining property it isexpected that the repairs to the mill will be completed by October 15th. They are down to the 400 level and expect to put in a station at that point and then drift east and west. The company will keep on sinking to the depth of 850 feet, when they expect to strike the combination of both ledges. The work in the shaft is progressing satisfactorily. At present they are working at the mine sixty men.

Butte.

Mercury: W. W. McMillan, Jr., of the Resumption mine, above Hurleton, has started crushing ore from his mine in the Phœnix mill.

The big head dam of the Cherokee mine, in Butte creek, that has successfully turned the waters into the company's main ditch for a quarter of a century, which has been under process of construction for two months, will soon be completed. The litigation between the bondholders and the Bank of California, which has tied up the mine for ten years, only ended a few weeks since, in favor of the bondholders, the validity of the mortgage being finally upheld. Operations are expected to be resumed by this management itself at Cherokee before long. At present about 100 miners are working on a royalty in the blue gravel of the lead formerly abandoned by the company as worthless. But on the transfer of the mine into the control of the bondholders, which will occur as soon as the order for foreclosure sale can be had, some time in September, developments into the main channel will commence. The immense size of the lead, 800 feet wide and 20 feet thick, averaging over $2.50 a cubic yard will, open up one of the biggest drift mines in the State. Owing to the increasing height of the bank, some 500 feet, it is a certainty that the management will be compelled to change from the hydraulic to the drift system. With this method between 400 and 500 men could be employed.

Register: C. S. Beresford, who managed the Catskill mine for a long time, has returned to Butte, and it is stated that it is his intention to pay off all claims against the mine and open it up.

At the Napa and Solano Mining Company's property they are engaged in running a tunnel in search of the old channel that has proved so rich along Magalia ridge. They are now in some 800 feet, and expect to be able to reach the channel 200 feet farther along.

Calaveras.

Citizen: At the Alpine mine near Washington ranch a tunnel has been run on the ledge for a distance of 140 feet, and a winze sunk to a depth of 35 feet. The ore carries a small quantity of free gold, and is heavily charged with sulphurets. It is being worked on a bond by Franks and Monckton.

At the Culbertson and Strough mine a crosscut tunnel has been driven a distance of 350 feet in solid rock, and it is calculated that the large vein of the mother lode will be tapped about 100 feet farther on. In running this tunnel several small veins have been cut, some of them prospecting well.

The California Exploration Company has a force of sixty men at work enlarging the capacity of the Amador canal. Preparatory work is being done on the proposed electric plant to be erected near Tripp's mill, Amador county, and the contract for building the dynamos has been let.

Chronicle: The mill at the Keystone mine at Railroad has been shut down and the work of sinking the shaft 200 feet deeper has been commenced.

Twelve tons of quartz milled last week from the Sheffield consolidated gold mine, yielded $918, and 5600 pounds shipped to Selby's smelting works gave a net profit over all expenses of $303.

Prospect: At the Royal mine the vein at the 560 foot level has assumed a more upright position, having an angle now of about 45°. The mill is working regularly.

The Mountain King mine has a whim put up and they are hoisting out good milling ore. The vein on top in some places is over 50 feet wide.

A discharge of 900 pounds of powder in the Central Hill gravel mine put off lately thoroughly shook up some 40,000 cubic feet of auriferous gravel.

Tom Peachy is still sinking his Hog Pen mine and the shaft has reached a depth of 15 feet, showing a well-defined vein of ore about 3 feet in width with indications of a permanent lead.

El Dorado.

(Special Correspondence).—A. Bentler is operating in channel mining three miles east of town. The tunnel has reached 800 feet.

R. E. Griffin has been elected president of the Baltic Mining Company. They are erecting a 5-stamp mill.

The tunnel on the Union, one mile east of town, has reached 230 feet. The owners expect to crosscut the ledge within 60 feet. This is an old quartz property being reopened. The surface ground paid richly when worked many years ago.

The shaft on the Amazon, 6 miles north of Placerville, has passed through the old works and is down 60 feet in a 4-foot solid ledge.

Goodwin George of the Baltic mine, has associated himself with L. M. Howard in developing the New Victor quartz mine on Slate mountain, 16 miles northeast of town.

The New Victor Gold Mining and Milling Company has been incorporated. The officers and directors are as follows: L. M. Howard of San Francisco, president; E. J. Parrish, San Jose, vice-president; Edw. Tyler of San Jose, treasurer; Chas. E. Smith, San Jose, secretary; Thos. Rogers of Mountain View, Mrs. Martha Oldham of Gilroy, and Mrs. D. Keller of Watsonville. The capital stock is $60,000. The work done on this property is a tunnel 350 feet on a ledge that runs from 14 inches to 5 feet. Out of 45 samples the average mill test yielded $10.86 per ton, and the sulphurets $499.32.

The Blanchard Mining Company has 90 feet of shaft and 80 feet of drift on a large ledge that has not been crosscut at yet. The company is composed of John R. Brown of San Francisco, and the following people from Antioch: J. C. Rouse, A. C. Hartly, J. P. Abbot, John Trengove and R. Harkinson. J. R. Brown is manager and John Trengove is superintendent. A new steam hoist is in operation.

Placerville, Sept. 7, '96.

Mariposa.

(Special Correspondence).—The Merced Gold Mining Company's mill at the Potosi has stopped running and the company is confining itself to deeper sinking at several of the shafts. This week some additional men were put to work, and, except that the mill is temporarily shut down, development work is proceeding much as usual.

William Johns, general manager of the Sierra Buttes Company, Limited, has been visiting that company's Tendron mine at Whitlocks, accompanied by his son. The installation of an electrical power distributing plant above Benton mills, on the Merced river, will be of the greatest importance to the Tendron mine. This is a large proposition that is entirely dependent on cheap power.

The Tyro mine is running on very high-grade ore from the 700-foot level. Exact returns are not given, but it is understood that the rock is going considerably over $20 to the ton, and the mill is running night and day, with every prospect of a continuance for a long time to come.

At the Mariposa Grant strangers come and go, and with each important-looking visitor rumors of renewed working are revived. John D. Ludwig, the superintendent, has returned after a protracted visit to the East and elsewhere. He appears to know no more of future movements than anyone on the outside.

Sheriff R. A. Prouty has bonded his ranch near Haywards, some 2000 odd acres, to W. J. Gwynn of London and San Francisco. This ranch (patented) contains bodies of quartz croppings that have never yet been properly prospected. Under the terms of the bond, 90 days are allowed for a systematic inspection, after which work must commence.

Near the Prouty ranch is the Denver mine, operated by Sellick & Co., of Chicago, under the principal superintendence of J. F. Clapp, a mining expert. Prospecting and development work has so far advanced upon this property that machinery for revenue purposes is about being erected. It is as a result of operations at the Denver mine that buyers have come into the field for the Prouty ranch, which has been a sheep run for the past generation.

The most important matter affecting Mariposa at present is the new electrical power plant on the Merced river, above Benton Mills, the promoters of which are Capt. A. H. Ward and Chas. T. Lindner. The water power is to be derived from the Broadhead old dam and carried by a ditch and flume about eight miles. Civil Engineer G. F. Allardt and a corps of surveyors have just completed all the preliminary work and returned to San Francisco. Mr. Allardt's report is entirely satisfactory. Some work continues to be done on the ditch and flume for the present, but it is intended that the matter will shortly be taken in hand by a large, incorporated company.

At Pino Blanco little work is being done. Capt. A. H. Ward was here for a few days recently, but returned to San Francisco on his way to New York. It is understood that his visit to the East is in connection with the Pino Blanco and the electrical works on the Merced river.

At the Laura La Grande mine, above Coulterville, ore running as high as $50 to the ton continues to be crushed. It is very easily mined, and the owners—Messrs. Macfarlane and Duncan—appear to have a perfect little bonanza. They are doubling their crushing plant.

In the same district the old Campadonico mine is being reopened under the charge of James Kennedy. Half a dozen men are at work retimbering and cleaning out, and the mine will soon be in full working order. When worked with an arrastra in olden days, the yield from this mine was large, although the vein was small.

Coulterville, Sept. 8, '96.

Miner: Col. Haskell, who has bonded the Little Wonder mine at Big Oak Flat, has contracted for 30,000 feet of lumber now being delivered and office buildings are being erected. The new 5-stamp mill will be running shortly.

Gazette: On Mariposa creek about four miles below the Francis mine, Hall, Howard & Co., of Merced, have opened a new mining property. They have completed a 5-stamp mill and started to crush ore.

Nevada.

Tidings: The Lamarque mine, south of Grass Valley, has been examined by representatives of an English company, who also looked at other property in the vicinity.

Telegraph: In the W. Y. O. D. mine above the 12-level there is considerable work now being done and in the 11-level and above that there is rich ore.

Union: It is reported that a rich ledge has been struck in the Old Home mine near Blue Tent and that the shoot is an extensive one.

Placer.

Colfax *Sentinel*: At the Mayflower mine last week 3½ feet of gravel was struck at a point 125 feet up the incline they are now running. A survey for hydraulicking has been completed. The company expects to impound debris in Black Oak canyon.

The Redstone mine, near Blue Canyon, has closed for a time.

Plumas.

National-Bulletin: The Genesee mine is closed down and rapidly filling with water. E. Kelsey is erecting an arrastra where the mill stood.

San Diego.

Jesse R. Grant and others have incorporated for the purpose of working the Ballena placer mines near Julian. The owners, Bailey, Sawday, Jacoby, Harritt, Fisher and others, have done considerable development work, principally in the construction of ditch and tunnel.

The Hubbard mine has opened up.

The Owens mine has good chutes of rock in both drifts.

Robert Gardiner will resume work on his Blue hill property soon.

Some rich quartz was struck in the Gold King mine lately.

F. Holland, of the Elevada, has started a tunnel to crosscut for the ledge.

Shasta.

Courier: At Hetchel's mine near Whisky Creek the six small ledges appear to be gradually converging to a point, and the indications are that they will terminate in one main ledge.

Free Press: At Cinnabar, O'Shay and others are meeting with good results at the "Boulders," the new discovery. Shafts are being sunk and tunnels run.

The Ellery brothers have bonded their mine near French Gulch for $40,000.

The Peerless Hydraulic Mining Company at Muletown have about two miles of the ditch completed. There yet remains seven and one-half miles to be constructed.

Siskiyou.

Reporter: The Gumboot mine is at a depth of 85 feet. A new tunnel is now under way to tap the lode a 100 feet deeper.

The Columbia mine on Old Baldy is producing good ore and the mill is running at its full capacity. Over twenty men are employed.

The Mabel mine has a great deal of good ore on the dump. This mine joins the Columbia on the east, and is an extension of the same lode. They are at present erecting a 5-stamp mill on Mill creek, below the Columbia mill.

It is reported that work will soon begin on the Quartz Hill mine.

Journal: The big French creek ledge, about seven miles from Etna, is to be opened up again soon. The 5-stamp mill at that ledge is to be increased five stamps. This ledge is one of the largest in the county.

The French company, which owns the mine in the Wild Cat country, on South Fork, will soon commence work with a large force of men. They will build an eight mile ditch. The same men are interested in this enterprise that own the big hydraulic mine in Trinity county.

Bart Shelly struck a ledge on Cherry creek lately, which is composed mostly of silver ore, but containing gold as well.

Journal: George A. Warder has put up a 2-stamp mill at the Crowley mine on the south fork of Scott river for the purpose of prospecting. The ore is of low grade, but the ledge is very large, ranging from 10 to 20 feet in width. It was lately purchased by Mr. Warder, who intends doing considerable development work, with a view of putting up an extensive mill if the quartz improves to justify the cost.

The Distlehorst and Barton Klamath river dredger is said to be a pronounced success. It is not known exactly what the result has been, but from all that can be learned, it is certain the result has been far beyond the expectation of the owners of the dredge.

The Company D mine on Long gulch, formerly the S. and S. mine, is producing some good rock.

The old Montezuma mine, near Callahan's, is paying well this year. It is worked by a company of Chinamen, and a clean-up from from $1500 to $1800 is estimated.

The Nebraska mill is kept in operation most of the time. The rock from the ledge will go better than that taken out in the past.

The Ball mine on Salmon river, which has been closed down for some time, will soon be started up again, as it is thought the differences between the Siskiyou owners and the Eastern owners will soon be settled. The 20-stamp mill at this mine is the largest in Siskiyou, and the mine is perhaps the best in that vicinity.

The placer miners on Salmon river are getting things into shape to run as soon as the rains commence and furnish them with water.

Tuolumne.

Union-Democrat: The owners of the Tanzy pocket mine near Sonora lately took 169½ ounces of gold from a pocket.

At the App the air compressor is in position and will be used soon to supply the machine drills. The mill is kept running steadily on a good grade of ore.

The new hoist and air compressor are being erected at the Dutch.

Independent: Lord Sudley, of England, accompanied by A. L. Pearse, a mining expert, is making an examination of the Alabama.

At the Santa Isabel the 125 H. P. electric plant being erected near No. 1 shaft is nearing completion. As soon as it is turned over work in all three shafts will be resumed.

At the Bellview the preliminary work of preparing to put in water power instead of steam is being carried on. The ore on the lower levels is of higher grade than much that has been worked heretofore.

At the Red Light mine the tunnel is in 212 feet.

At the Rawhide the new chlorination plant of three tons capacity will be ready to fire up in a short while.

Work on the long tunnel to connect the Eagle and Shawmut mine is progressing rapidly. As soon as the work now carried on is completed a new mill will be built.

The new shaft at the Golden Rule is now down 400 feet. When it reaches a depth of 600 feet, levels will be driven and the ore body explored and blocked out.

NEVADA.

Harry N. Morse of San Francisco and some English people in 1882 bought several locations forty-five miles south of Austin, in the Shoshone range, and tried to work them as silver mines; but, after spending considerable money, shut down. Two years ago Morse bought out the interests of his associates and has since been developing the mines. He has opened up 300 feet of ledge from 4 to 8 feet wide that assays from $10 to $30 in free gold and sulphurets and has erected and started up a 10-stamp mill.

The DeLamar Company is determined to find out the depth of the great mine. It is reported that they are about to sink a deep shaft in the No. 10 tunnel, which at present is the lowest workings in the mine. The mills are crushing from 260 to 280 tons of ore daily, and still are not being operated at their full capacity.

The April Fool mill is running very successfully, and 97 per cent of the values of that property's ores are being saved. Recently the company bonded one of its mines—the Jumbo—to parties who are now sinking upon it.

It is reported that Capt. De Lamar has taken an option on the Rose group of gold claims near Tuscarora, Nev.

White Pine *News*: The Clements Bros. have struck a large and rich vein of gold ore on the south side of this town. This property has been traveled over for years, in plain view; but as we have never looked for gold until lately, no one ever took the trouble to prospect it before.

Pioche *Record*: The De Lamar Company is said to be taking its best ore from a large chute developed in Lucky Bar ground, and which pitches toward the southeast. This fact encourages claim owners to the eastward and will result in prospecting, since it is acknowledged that Ferguson district, in the formation of its mineral, directly contradicts, in several important respects, the long cherished opinions of mining men. Chloride of gold in native form, it was asserted not long ago, had never been found; but the bulk of the best ore in Ferguson district is of this character.

State Journal: Capt. W. F. Mills, D. Dickey and others have struck a lead on Granite Hill that is rich in gold and copper. Specimens of the ore show well in gold and carry more or less copper. A shaft has been sunk on the lead to a depth of 18 feet. The lead is about 16 feet wide and the ore streak is 3 feet wide.

Capt. A. D. Griffin has discovered a gold-bearing lead. Several tons of the ore worked $39.50 per ton in gold at the reduction works, with concentrates to hear from. The lead is about twenty-one miles from town, close to the California line.

OREGON.

Bedrock-Democrat: A Seattle syndicate has purchased extensive placer grounds and water rights near Susanville. The ground, including three claims at the mouth of Bear creek, was obtained from Ives Brothers and Richardson. It is intended to take water from Camp creek.

The Clark's creek placers, operated by the French syndicate, have closed down for the season.

Democratic Times: It is reported that work will be resumed shortly at the Illinois River copper mines.

John C. Allen and J. B. Dyar of Talent have purchased the Kneiss mine at Hamburg Bar, on the Klamath, and will operate it this season.

It is reported that A. W. Sturgis has sold his placer mines on Forest creek to Portland parties for a large sum.

E. B. Jennings of Table Rock precinct has bonded several hundred acres of land to A. A. Davis of Medford, who will prospect for coal. There seems to be a valuable deposit in that neighborhood.

BRITISH COLUMBIA.

(Special Correspondence).—The Cariboo and Williams' Creek Gold Extraction Company, Ltd., is successfully working Black Jack ore. Five days in each month are devoted to working any ores, in 5-ton lots or less, at actual cost of treatment. The company is operating the Government reduction works under lease, and the 5-day clause of the contract is reviving quartz mining. Many claims have been staked and several 5-ton lots are to be tested. It seems that quartz development in Cariboo is now fairly in sight. The Discovery Company's ditch, Little Sally Creek, is completed and the property will soon be outfitted.

The Big Sally Creek Company, Wm. Adams, M.P.P., manager, is running a tunnel to tap the deep ground on that creek.

On Stewart creek, emptying into Big Valley, Cockrell, Isaacs, Johnson & Walker have run 250 feet of rock tunnel and are now in gravel paying 2 ounces to the set.

The Cariboo Mining and Development Company, on Wolf creek, a tributary of Antler, are opening a hydraulic mine. Water will soon be taken from Antler creek by seven miles of

ditch. Work on the ditch is well under way.

On Aug. 24th the Waverly Hydraulic Mining Company, Grouse creek, declared dividend No. 1 of $1 per share.

The other hydraulic mines in the vicinity are owned by individuals. They have, almost without exception, paid better than usual.

The Cariboo Gold Fields, Ltd., bed-rock drain, Williams creek, is being advanced about 20 feet per week.

New pipe is being placed on the Eye Opener hydraulic

Bunkerville, B. C., Aug. 28, '96.

Rossland *Miner*: The Heather Belle group has been bonded to a syndicate represented by Mr. Wright, of Weeks & Wright, of this city, and Albert E. Dennison of Toronto. The owners were James Davidson, Alexander and James Mowat, Samuel Forteath and James Burns. The purchase price is stated to be $25,000.

Development work has been started on the Northern Belle, on Red mountain. It was bought in July by W. A. Campbell for himself and some Toronto friends and incorporated in Toronto for $1,000,000.

The Cliff has encountered a good body of ore 5 feet wide, carrying 15 per cent copper, with a good value of gold. The chute is 132 feet long.

The control of the Union Gold Mining Company, Limited, has passed into the hands of the Walters Company, at the rate of $48,000 for the entire capital stock.

John Moynahan has resigned the superintendency of the Le Roi mine and has joined a syndicate composed of W. A. Campbell and P. Burns of Rossland and William McKenzie, in the purchase of the Iron Colt for $40,000 cash.

The Le Roi shaft is now down to the 500-foot level and the bottom of the shaft, 8x14 feet, is in solid, clean ore. The ore is of the highest grade ever encountered in the mine, running from $40 to $500 in gold. There have been explorations with the diamond drill extending 100 feet below the 500-foot level, and these show the ore continuous all the way down.

Five-sixths of the Nancy Hanks has been sold to E. W. Nettleton and California people. A 100-foot tunnel will be commenced at once.

Nelson *Tribune*: The sale of the Montezuma and Mexico has been finally arranged for $20,000.

New Denver *Ledge*: Colonel Jenkins has returned from a trip to Cariboo creek where he obtained a bond on the Promatura for $30,000. The claim is considered one of the best in the district and is opened by a 100-foot tunnel. A sample taken went $80 in gold and silver. The ore is white quartz and carries some iron and copper sulphides.

The Iron Colt, lying between the Iron Horse and Columbia in the Columbia mountains, has been sold to a Toronto syndicate for $40,000.

UTAH.

Tribune: Shipments of ore from Bingham in July aggregated 6151 tons. But for the slump in lead, which has caused a decided falling off during the past two weeks, the shipments for July would have exceeded those of any previous month of the year.

A half interest in the Song Birds at Mercur has been sold by W. S. Fugate to Simen Bamberger for $25,000.

At the Geyser the quality of the ore in the new tunnel above the Marion is improving. The entire cost of mining and milling is now reduced to $1.77 per ton. Assays of the tailings show a loss of only 41 cents.

At Tintic a new tunnel to tap the vein on on the Hamburg has been commenced about 400 feet north of the old one, and will be 500 feet long and tap the vein 125 feet below the the present level.

The North Star Company is grading for a new shaft and will commence sinking in a few days.

In the State Line district the Sulphite has been bonded to a Wisconsin capitalist named Leroux for $50,000, though not a foot of work has been done.

The Elmore mine at Rocky Bar has suspended operations. The rich body of ore found in this mine last spring was soon exhausted, since which time explorations have been made with diamond drills, but without avail. and the managers decided to quit.

Park City *Record*: Owing to the tightness of money the Putnam mine was closed down on September 1st, to await the verdict of the American people regarding the future of silver.

Work has been suspended at the Bogan and the water now has possession of the shaft. All the rumors about pumps being broken and boilers strained are without foundation, the simple truth being that owing to the low price of silver and lead and the general disturbance in the mining industry, it is impossible to sell stock or raise money to carry on a prospecting enterprise.

IDAHO.

In the Pierce City district, on Reed's creek, a company are opening up a large placer claim and have 25 men employed, and will within the next few weeks have their flume work completed and commence washing gravel.

Adjoining this claim another outfit are making arrangements to work over a large body of dirt and are busy with men constructing ditches and a reservoir for a supply of water.

The American Placer Mining Company, on the Oro Fino, after an expense of $30,000, have commenced washing pay dirt.

Inter-Mountain: Idaho is making a record this season in the development of her placer diggings, and if the interest taken in these deposits continues it will not be many years before she will be a formidable rival to California.

On Snake river also placer mining is being engaged in from the Wyoming to the Oregon line, and in various portions of the State a number of placers are being operated with encouraging results.

The Bingham Placer Mining Company is letting a contract for the construction of a 3½-mile flume and ditch, and the erection of a complete hydraulic plant on its placer deposits in Lemhi county; while in the same county, in Prairie Basin, Judge C. W. Stayner and John Buck are putting in a plant.

World: The Elmira, at Banner, will do nothing more until there is an advance in the price of silver. When running full force this company employs about 200 men.

Avalanche: The Old Glory Mining and Smelting Company now has the Henrietta mine at Wagontown, and is pumping it out and putting it in shape for production.

The Ozark mine's new mill at Florence has been started up. The Gold Bug mine has struck a rich ledge and will put in a 10-stamp mill at once.

MONTANA.

Operators of the Young & Brickley placer claims, located about fifty miles northwest of Missoula, picked up a nugget valued at $120.50 lately. The properties are now under option for $5,000.

A body of ore has been struck in the Cook mine, near Virginia City. It is 7 feet wide and is said to be rich. The company have about 1500 tons of ore on the dump, and are considering the advisability of erecting a mill.

There has been discovered another rich placer section in Granite county; it is located near the famous Quartz gulch, in Montgomery Gulch.

Butte *Miner*: At Saltese, the lease held by W. L. Leadford on the copper water flowing from the St. Lawrence mine has expired, and the Anaconda Company has refused to renew the lease. Leadford has made a fortune out of his contract; his profits are said to have amounted to about $8000 per month. The water from the mine was turned into vats in which old iron, tin cans and other metal refuse was thrown, and the copper thus precipitated, a mine of wealth was opened up. According to his contract with the Anaconda Company, he turned over to the company 25 per cent of the profits of his enterprise, which left him a handsome margin of profit, with no capital invested except a lot of old iron. Some time ago the company went into the business of saving the copper from the water before it left the mine, by using up old iron, thus weakening the water. A suit was the result, as Leadford claimed that this was an infringement on his lease. He applied for an injunction against the company, but it was refused. The process was discovered by accident by a man who threw some old tin cans into the stream as it flowed down the hillside. Leadford was lucky enough to get a lease from the company for two years. Fires on the lower levels of the St. Lawrence are said to be the cause of giving the waters the peculiar properties which make it so valuable.

The Twilight has again resumed operations on a large scale and is now paying handsomely. The Twilight is in the Flint Creek district, a short distance from the Flint Creek mine.

Clancy *Miner*: The Copper Jack, on Warm Springs creek, above Alhambra, is reported to have been sold to a Helena syndicate.

The old L. Wattricle Mining Company of Marysville has been revived. This company owns five claims, all of which have been more or less developed; one is the extension of the Drum Lummon, which has paid its English shareholders over $10,000,000 in dividends. The Drum Lummon is now 1800 feet deep and the deeper the richer the ore becomes.

The development of Jerome creek, 25 miles east of Palouse, is proving satisfactory to its owners. While as yet but three properties in the district are being opened to any extent, there are 22 discoveries which are known to prospect with mortar and pestle.

Inter-Mountain: Camp Creek is now a deserted village, and only three or four men now remain in the once lively mining camp. The machinery on the Anaconda properties has been removed and the hoist on the Clipper has been sealed up, probably not to be opened again for long years. On Corral gulch work has also been practically suspended since the Montana Ore Purchasing Company shut down the Maggie.

Articles of incorporation of the Black Placer Company have been filed in Butte.

At the Anaconda properties the foundation for the big engine at the Never Sweat is about completed and is now enclosed by the framework of the hoist. At the St. Lawrence sinking is still in progress. On the south side of the hoist a dozen or more workmen are engaged in excavating for the foundation of the mammoth engine which will replace the present one. At the High Ore No. 2 the shaft has now reached a depth of over 1400 feet. Several sections have been cut, but no drifts have been run, and it is likely will not until the shaft reaches a depth of at least 2000 feet. It is the intention of the company, it is understood, to continue sinking until a depth of 4000 feet is attained. It is predicted that the Anaconda Company will be able to double its output of copper ore by next year.

SOUTH DAKOTA.

Black Hills *Miner*: The owners of the Rua group of claims, adjoining the Gushurst property, have leased fifteen of their claims to Rua Bros. & Co., who are enlarging the old workings and will work the property in a systematic manner.

In drifting from the main slope the Hawkeye Mining Company have opened up a new body of cement ore that yields a good prospect by pan and mortar test. The ore is an oxidized conglomerate, altogether different from the other cement ore in the property, which is non-oxidized and of a grayish color.

The ore shoot opened on the Kickapoo lode, situated south of the Wasp No. 3 property, is proving to be a bonanza. The tunnel has been driven into it for 12 feet, at which point it is 6 feet thick. An average sample taken from the face recently assayed $112 gold per ton.

Siliceous ore averaging $75 per ton in gold has been discovered within the city limits of Deadwood, and promises to develop into a most valuable thing. The ore lies in the limestone, in vertical formation, identical with the formation at Ragged Top, where such rich ore has recently been discovered. The discovery is near the smelter, where its possessions aggregate 700 acres of ground lying east and north of the smelter.

WYOMING.

T. Sun and C. O'Conner have sold to E. A. Greene, of New York, 3000 acres of gold placer ground at Oregon Buttes, in South Pass district. The purchase price is given out as $150,000.

At Laramie some fine samples of mica have lately been received at the Mining Exchange. One is from near Laramie peak. It is perfectly free from iron stains, has a good cleavage and the sender states that sheets 12x12 are easily obtained. Another sample is from near Battle lake, in Carbon county, and is similar in all respects to the above.

The Exchange is also in receipt of some samples of asbestos from the vicinity of Battle lake that are superior to any yet discovered in the State. The owners of both the mica and asbestos in Carbon county report that arrangements have already been made for the development of the property and the disposal of the products to eastern parties.

It is reported that Mr. Douglass recently purchased a mill for his property on Sandstone creek in the Savary district in Carbon county. This property consists of ten claims. The principal work has been done on the Northern Belle. The company have run a tunnel in on this property a distance of 240 feet, where the ore body is 4½ feet wide and an average of assays made gives $10 gold per ton.

The Lone Tree mine, owned by A. W. Hayward at Granite canyon, has just been sold to an eastern syndicate who have already commenced to work it. At a depth of 40 feet the ore body is 4 feet wide and shows by fire assay from $35 to $40 per ton gold.

A vein of gold-bearing quartz has been struck in the Big Jim shaft at a depth of 50 feet. This property is but a few yards from the Lone Tree and is owned by the same syndicate.

COLORADO.

At Gunnison a five-foot vein of good looking ore has been cut in the Dubois tunnel, which is being driven by the Dubois Tunnel Company. This find was made at 350 feet depth.

At the placer mines at Madera station, three men are at work making good wages with common gold pans. This placer is on the Lake fork of the Gunnison river, thirteen miles from the mouth of the stream.

Victor *News*: In the May Belle at Lawrence the tunnel is 225 feet from the mouth, and in the breast between granite walls, a vein was encountered, which, it is stated, is 11 feet in width and assays run from $188 to $60,000 a ton.

The Baldwin tunnel will resume active operations in a few days.

The August output of the Anchoria-Leland Company approximated $40,000, after hauling and smelting charges were paid. This is about $5,000 over last month's figures. The manager is confident that in the future the mine will ship at least $50,000 per month net for the balance of the year.

Denver *Republican*: At Cripple Creek J. E. Phillips has sold the major portion of his holding in the Cripple Creek Gold Exploration Company to a French syndicate and retired from the active management of the property. About a year ago he formulated a company and interested Colorado Springs people in developing the ground for the exploration of the big vein coming down from the hills. The Exploration Company has been a favorite with Eastern investors, and when the French syndicate made an offer for a large block of the stock Phillips decided to sell and turn his attention to his other enterprises.

The Findlinger lease on the Mountain Monarch of the Gold Standard is turning out some high-grade ore from a winze sunk from the tunnel level. Assays had on sylvanite rock taken from the working ran close to $1000 a ton, and the strike is fulfilling the expectations it excited when first made a few days ago.

One of the leading ore haulers of the camp states that the output of the camp last week was the heaviest in its history, and the statement is borne out by the sampling and railroad men.

The Goodwill tunnel, starting from Cottontail gulch, between the two railroad tracks, is headed for the heart of Gold hill and intended to cut the Anchoria Leland main vein at a point 676 feet below the collar of the main working shaft in a mean length of 3000 feet. The tunnel is to be run primarily for drainage and transportation, and the company are to erect mills for the reduction of low-grade ores; to develop electric power for lighting, etc., by the waste drainage water. The tunnel will develop the veins at a depth of from 500 to 900 feet. No stock of the company is for sale on the market, the stockholders being W. P. Bonbright & Co. and their clients in France and Belgium, and also Messrs. Helm, Weston, Howbert, Parsons, Shields and Blackburn. The working capital has been subscribed, and as soon as the money arrives here, which will probably be in four or five days, the machinery will be ordered and work commenced.

The Independence mine is producing an immense amount of smelting ore from lower levels, and without touching the reserve above tide line or low grade zone. The output for the past week has averaged seventy-five tons a day.

News comes from Loveland that a 3-foot vein of pay ore has been cut in the Long View tunnel at Camp Carter, which has caused considerable excitement in camp.

At Ward the new stamp mill on the Montgomery group of mines, owned by members of the Schlitz Brewing Company of Milwaukee, Wis., has been started up.

The Unita Company intends putting a large hoisting plant, formerly used on the Unita, on the Baxter mine. They will also put a pump on the Boston mine and take out the water, and get both mines in shape for work.

About 120 tons of good ore is now put through the Modoc mill daily, ten additional stamps having just been put in.

Sayward, Woolching and Koch of Denver have started to develop the Chatam mine. About ten months will be devoted to exploration work.

Drifts were started this week from the 90 foot shaft of the Gold King mine and a big pile of good milling and smelting ore is being taken out. The owners intend putting up a new shaft house and steam hoisting plant soon.

The Cleveland owners of the Sun and Moon group of mines at Idaho Springs in the levels run off at a depth of 16 feet now have ore 42 inches in width, it carrying lead and copper of a smelting value. To the east the streak is also coming in and lying by the side of ore carrying gold values, a test returned 20 92-100 ounces gold per ton

California representatives were in Ward during the week looking over the district with a view of investing. They offered $25,000 for the Lord Byron, $5000 cash in hand and the balance in sixty days. The offer was refused.

In extending the levels eastward into practically virgin ground, some large bodies of mineral have been opened up at the Albro property.

In the Pine creek district the Gold Standard property is to be opened up again. Mr. Zehrung of Colorado Springs has obtained a lease and bond on the property and is backed by parties interested in the Ironclad property of Cripple Creek. The Gold Standard property has been worked more extensively than any other in the district, but owing to difficulties among the stockholders, it was closed down towards the end of 1895. There is a large body of medium grade ore in sight.

NEW MEXICO.

Silver City *Enterprise*: The Treasure Mining Company has consummated the purchase of the Atlantic and Deep Down property. The purchase price of the St. Louis interests has been paid in full and a large installment paid upon the Wagner interest.

There has been brought from the Bell & Stevens claim, on the Pacific lode, 300 ounces of gold. The main working shaft, which is now 380 feet deep, is being retimbered and enlarged near the surface, preparatory to sinking for deep working.

ARIZONA.

Journal-Miner: The Co-operative Gold Mining and Milling Company has its mill about completed. This company has put in an extensive pipe line, through which they will obtain a water supply to run an electric dynamo for power to run their machinery. This company's mine is a north extension of the Gold Note mine.

Gov. F. A. Tritle is developing the Monarch, south of Prescott. The ore body has widened out rapidly. The ore averages about $6 per ton in gold, 14 ounces in silver and 20 per cent in copper.

D. B. Gillette has broken all mining records in this county in the development of the Surprise and Gold Note mines on the Black mesa, near Bumblebee. He commenced work on the Surprise mine on June 11th, and on August 24th had run drifts and sunk shafts aggregating in all 521 feet, 6½x4 feet in the clear. On July 14th work was commenced on the Gold Note mine and on August 24th the work done on it in sinking and drifting. In the Gold Note he has twelve feet of good milling ore, while in the drift of the Surprise there is six feet of good ore. It is all free-milling gold ore. Mr. Gillette has also recently purchased the Hercules mine from Geo. Zika and is arranging to place a hoisting plant and pump on it.

Kicker: Among the cyanide plants in the Territory are the following: At Harqua Hala, 160-ton capacity; at Fools' Gulch, of 100 tons; Congress, 80 tons; Wickenbug, two plants of 60 tons each; Seymour, 40 tons; Tombstone, four plants of 10 to 30 tons each, and a number of other plants throughout the Territory on a small scale, from 5 to 15 tons capacity. At El Rio a large plant is now being built and also one at Golden.

Oasis: At Washington Camp the water in the Duquesne mine was pumped out some time since, and the shaft is sinking and drifts are running, good ore coming out from all points.

The Golden Dream Mining Company will put their mill on the Colorado, two miles above Picacho.

SOUTH AFRICA.

South African *Mining Journal*: At the Geldenhuis Deep at the beginning of this year there were 16,500 feet driven, so that to complete the development of 900,000 tons of ore an additional 3500 feet of driving was required, bringing the total to 20,000 feet. This amount of driving cost £140,000, at the rate of £7 a foot, including all underground and general mine expenses and equipment, except cost of main pumps, and being also at the rate of 3s 2d per ton opened. During the first three months to the end of December last only 24,000 tons of ore were crushed. The mill was only working to two-thirds of its natural capacity. When the full stamping power is started such an amount will be nearly accounted for in a single month. The ore is expected to yield about 10 dwts, mill and cyanide together, worth about 35s, while the working expenses are set at 25s for 100 stamps, and at 20s when the 200 stamps shall be running.

The Pioneer has declared in dividends, during this year, a total of 200 per cent to August 1st, the amount having been 50 per cent in February, 75 per cent in March and 75 per cent in June. This is even better than was generally expected when the company last year took over the Tribute mill and cyanide plant, when monthly profits of about £5000, nearly equal to a rate of 300 per cent per annum upon the capital, was confidently expected.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPT. 1, 1896.

566,837—BOILER FURNACE—P. H. Bagley, S. F.
566,734—DRY DOCK—Boggs & Cameron, Portland, Oregon.
567,076—[illegible]NT TRAP—P. H. Brown, Redlands, Cal.
566,895—PUMP—Geo. E. Dow, S. F.
566,903—FISHING BASKET—L. E. Gieschen, Oakland, Cal.
567,092—AIR COMPRESSOR VALVE—R. F. Grigsby, S. F.
567,096—CHAIR—Harvey & Amos, Los Angeles, Cal.
567,101—GATE—J. H. Johnson, Silverton, Or.
566,777—MACHINE FOR MAKING POWDER—J. E. Layng, S. F.
566,775—REGULATOR—W. O. Ludovici, S. F.
566,929—WINDOW SCREEN—O. G. Niehaus, Berkeley, Cal.
567,041—LABELING MACHINE—H. Rawlinson, S. F.
566,873—BOTTLE—W. H. B. Schmied, Napa, Cal.
567,048—WOOD WEDGE—J. H., J. R. & W. E. Smith, Snohomish, Wash.
566,942—BEER FOUNTAIN—W. H. Smyth, Berkeley, Cal.
566,878—CASH REGISTER—E. T. Taylor, Oakland.
566,820—KEY RETAINER—Tucky & Harris, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SINGLE ACTING CRANK PUMP.—George E Dow, San Francisco, Cal. No. 566,895. Dated Sept. 1, 1796. This invention relates to that class of pumps having a number of plungers known as "multiplex plunger pumps." The object of the invention is to provide a system of lubrication combined with automatic means for draining and preventing accumulation of water in the crank case, and maintaining the oil level or surface of the lubricant below the cranks, so that each crank will dip into the same, but so that the pump plunger will not come in contact with the body of lubricating liquid within the case. It consists of a closed crank case adapted to contain a lubricating liquid; a crank shaft with cranks situated within the crank case, plungers reciprocating at an angle above the horizontal and connected with the cranks; suction and discharge chambers with intermediate valve chambers connected with the upper part of the plunger chambers so that a vacuum is produced and the liquid moved through the valve chambers by the reciprocation of the plungers, a pipe connecting with the suction chamber and with the pipe which unites the top and bottom of the pipe case with check valve for the discharge of any surplus; a means for lubricating the plungers and supplying lubricant to the crank case; the suction chambers connecting directly with the pump chambers, but cut off from direct connection with the plunger chambers.

WINDOW SCREEN.—Otto G. Niehaus, West Berkeley, Cal. No. 566,929. Dated Sept. 1, 1896. This invention relates to that class of window screens in which the screen is composed of intersliding sections whereby it may be adjusted in length to be inserted in and fit the aperture or space of the window casing, and to form a proper joint between the sill on which it rests and the lower rail of the sash which is drawn down upon its top. The chief feature of the screen consists of clamps or straps secured rigidly to one of the intersliding sections, one above and one below near the inner corner of one of its ends, each of said straps overlapping the other section and having a down-turned end sliding in a groove in said section, and similar clamps or straps secured rigidly to the other section and overlapping the first-named section, and fitting and sliding in grooves therein. Another feature of the invention consists in stops at one end of each section by which the two sections, when closed, are not only limited but, when opened either fully or partially, are so protected between their screen surfaces as to form a fly-tight joint. Another feature consists in bevelling both the upper and lower sides of both screens, whereby they are enabled to fit the window in any position in which they may be placed.

BOTTLE.—Wenzel Hyronymus B. Schmied, Napa, Cal., assignor of one-half to Henry Brown of same place. No. 566,873. Dated September 1, 1886. This bottle belongs to the class of non-refillable bottles and to that subclass in which provision is made for the necessary destruction of the head or neck of the bottle, or a portion thereof, in order to reach its contents, which destruction subsequently prevents its reuse. The bottle is formed with a neck having separated beads or rims on its exterior, adapting it to be broken in the space between them; a cork is fitted in the neck and traverses the plane of the space between the beads, so that a portion of it projects when the neck is severed; a hard metal disk is fitted on top of the cork to prevent the latter from being driven into the bottle, and a mass of hard material fills the neck above the disk.

FISHING BASKET OR CREEL.—Louis Edgar Gieschen, Oakland, Cal. No. 566,903. Dated Sept. 1, 1896. The object of this invention is to provide a simple, serviceable and convenient device which, while serving all the purposes of a disk, will serve the additional ones of a fly-book and leader-box. These latter purposes are subserved by forming in the cover of the basket receptacles suitable for the objects intended. One of these receptacles is for the leaders and comprises parallel vertically disposed slotted partitions through which the snells are passed and separate compartments at the ends of the main receptacle for flies. There is also provided a central compartment in said receptacle for moisture laden pads, and between these the loops of the snells lie. There is also provided a separate receptacle for the leaders, which said receptacle is furnished with moisture laden pads for keeping the leaders in a moist condition.

Coast Industrial Notes.

—The Los Angeles Oil Exchange has decided to establish a call board with daily morning sessions.

—At an election in Santa Barbara on Monday last it was decided to issue $60,000 bonds to supply the city with a salt water plant and to pipe water to Cold Stream canyon.

—Surveys are being made for an extension of the O. R. & N. road from Dayton. It is said to be the intention to build east to the Covello wheat district in Washington.

—The Common Council of San Jose has granted the Alum Rock and San Jose Railway Company permission to extend its track into the camping grounds of the Alum Rock park.

—The rolling stock of the Valley road for passenger traffic has arrived at Stockton but there is delay about putting it on until arrangements for the terminal property at Fresno are finally settled.

—The people interested in the proposition to build an electric railway through Sonoma and Napa counties from Embarcadero through Santa Rosa, Bodega, Knights valley, Calistoga and Napa valley to Sonoma want a guarantee of patronage, which they are securing in the shape of subscriptions to commutation tickets.

—In Eureka, Humboldt county, the Bear Harbor & Eel River Railroad Company has been incorporated with a capital of $200,000, of which $100,000 has been subscribed. It is proposed to build from Bear Harbor in a northerly direction for about fifteen miles to a place to be decided on hereafter. It will be devoted to the hauling of lumber at first but later on the company will probably engage in general freight and passenger traffic. The directors are E. J. Dodge, J. Hunter, T. Pollard, C. Stewart and A. B. Cooper.

—The Mariposa Electrical Company was incorporated Monday with a capital stock of $1,000,000 in 100,000 shares at $10. All the stock is subscribed by the incorporators, A. H. Ward, G. Ecker, C. T. Lindener, W. B. Taylor and H. C. Ward. The company proposes to erect an electric light and power plant opposite the old Benton mills on the Merced river, in Mariposa county, to which the water necessary will be conducted from the old Broadhead dam. It is stated that they will ask for bids for the erection of the plant which will cost $300,000, in a few days. The object of the company will be to supply power and light to the mines in the neighborhood.

Personal.

WILLIAM RULE has been appointed superintendent of the Mayflower mine at Forest Hill.

PROF. JOSEPH LECONTE is in Liverpool attending the meeting of the British Society for the Advancement of Science.

HANK SMITH, who was a superintendent on the Comstock many years, has been placed in charge of the Centennial-Eureka, in the Tintic district, Utah.

THOMAS N. WILLIAMS, formerly of the New Almaden mines, has been appointed superintendent of the Altoona quicksilver mine at Cinnabar, Trinity county.

OF the Californians who are away from home and have made reputations in the mining world, Hamilton Smith, who has been for several months in America, is at the head of the Exploration Company of London, which is generally supposed to have the backing and confidence of the Rothschilds. John Hays Hammond is consulting engineer in London for the Chartered Company of South Africa, which controls principalities and millions. Gardiner F. Williams, who is at present in California, is the general manager of the De Beers diamond mines at Kimberley, the largest mines of that kind in the world. H. C. Perkins has been in charge of the Rand Mines, Limited, at Johannesburg, where he has been sinking some deep level shafts, which, with their equipments, will cost $20,000,000. He has made a fortune and desires to retire from that work. He is now in London. Henry Janin resides near London and continues to interest himself it mining matters. H. H. Webb is in Johannesburg as consulting engineer for the Chartered Company, succeeding John Hays Hammond there. L. Gilson is in London connected with the management of the Exploration Company. William F. St. Auburn has returned from Matabeleland and gone to New Zealand to examine properties for a London syndicate. Capt. Thomas Mein sailed from London on the 5th. He will not return to Africa, having made a fortune, but will interest himself in California mines. J. B. Hobson is in charge of hydraulic mines in Cariboo, B.C. Joseph McGillivray is opening up mines in Spain for a Paris syndicate. Louis Janin, Jr. lately placed an Australian mine in London, where he is now making his headquarters. Charles Butters is still in Africa, where he has made a name in developing advanced methods in working ores.

Obituary.

NELSON WESCOTT, a mining engineer, who came to California in 1853, died at the age of seventy-five in Santa Rosa last Monday.

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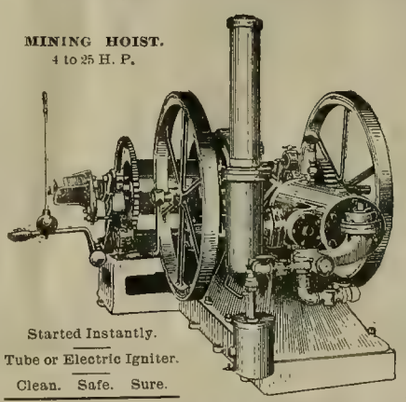

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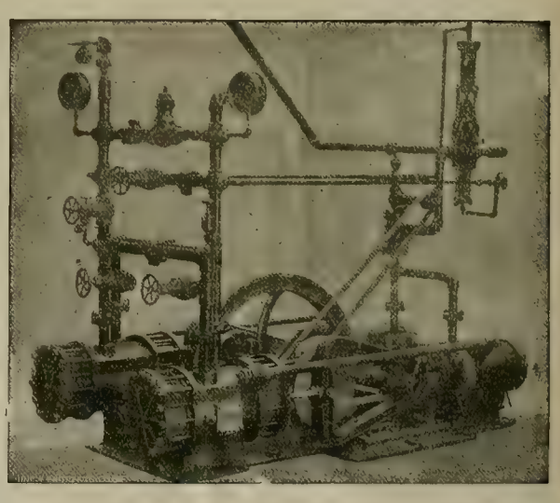

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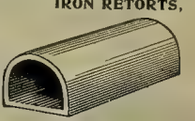

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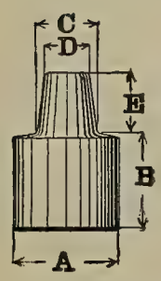

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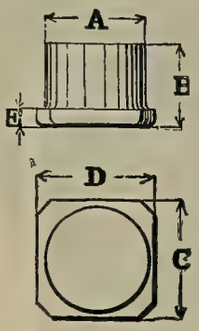

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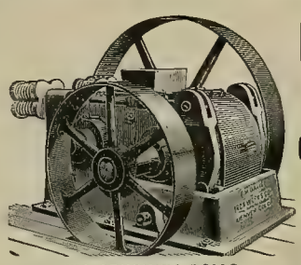

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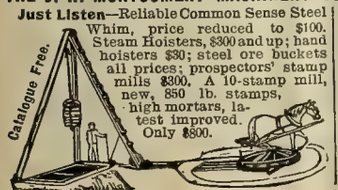

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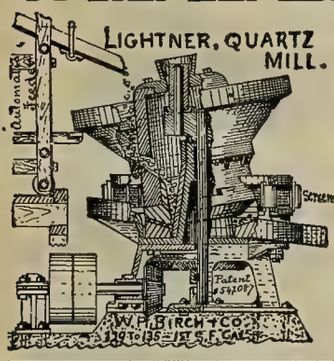

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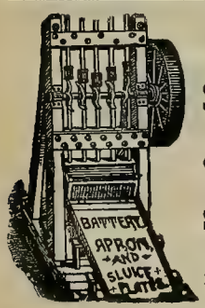

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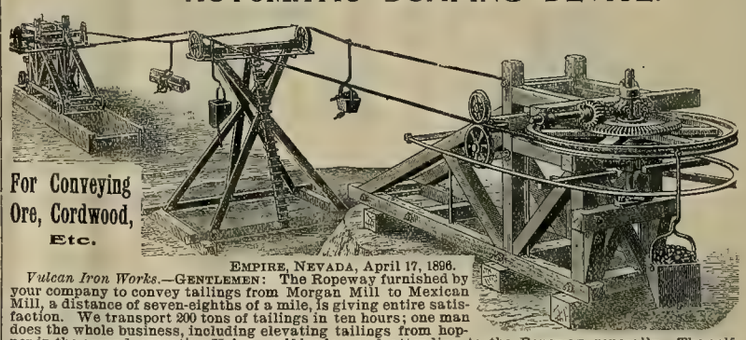

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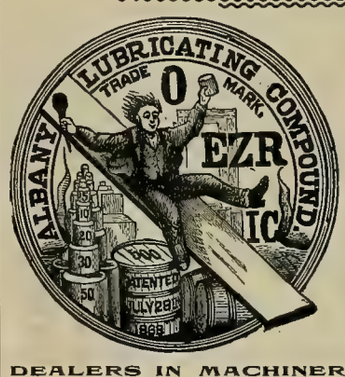

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THIS TRAMWAY IS THE BEST THAT HAS EVER BEEN PLACED ON THE MARKET. IT HAS NO RIVAL. IT IS STRICTLY AUTOMATIC AND ITS CAPACITY RUNS UP TO 1000 LBS. PER BUCKET. ANY ONE CONTEMPLATING THE ERECTION OF A TRAMWAY SHOULD INVESTIGATE ITS MERITS BEFORE PURCHASING ELSEWHERE. . . . . .

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WE ARE MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR

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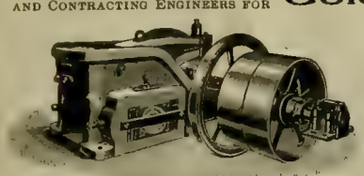
Investigate Our Late Improvements in ORE CRUSHING MACHINERY.
We Guarantee Capacity Per Day to Any Degree of Fineness. . . . . .



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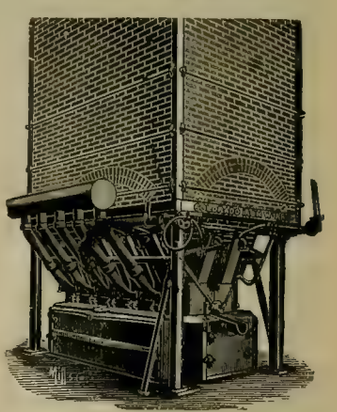
OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



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Mining, Milling and Smelting MACHINERY.

Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps, Compressors, Hoists, Boilers, Etc., Etc.

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Work the Best! Prices the Lowest!

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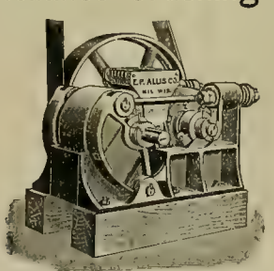

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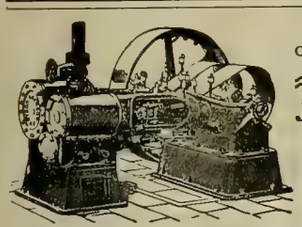
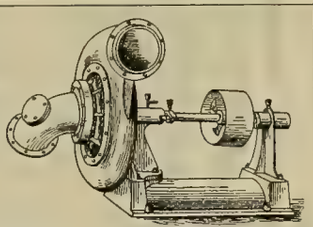
Write for Our New Catalogue.



WRITE FOR CATALOGUE NO. 15.

Jackson's GAS —AND— OIL ENGINES.



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For Irrigation, Drainage, Dredging, Mining, Etc. Capacities from 50 to 50,000 Gallons Per Minute.

BYRON JACKSON MACHINE WORKS,

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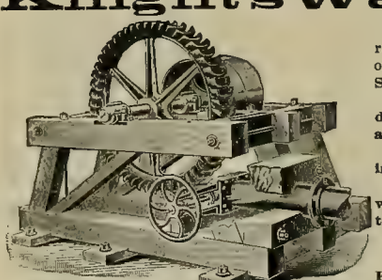
Knight's Water Wheel.



The accompanying cut shows the general arrangement of Knight's Standard Water Wheel, of which there are hundreds in use in different States of the Union.

These Wheels are made from 2 feet to 6 feet in diameter, from 10 to 1000-horse power, and adapted to all heads and purposes.

Wheels inclosed in iron cases, from 6 to 24 inches.

Wheels for electrical power can be furnished with or without Governors. Highest regulation guaranteed.

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For full particulars, send for descriptive catalogue.

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611 and 613 FRONT ST., San Francisco, Cal.

DEWEY & CO., Patent Solicitors,

220 MARKET ST., SAN FRANCISCO.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 10, 1896.

Business holds up remarkably well. The bulk of orders are coming to hand from mining camps and more distant points. This demand seems to be the advance movement in winter stock buying. The trade looks for an increase of at least 33⅓ per cent in the buying for winter stocks over that in 1895. From the agricultural districts the demand continues free. If we have an early rainy season, which many look for, there will be good buying from the agricultural districts well into the winter. With manufactures and iron workers in general there is continued activity, with some new orders secured the past week.

Although the supply of gold coin held by banks has increased to a very considerable extent, yet the local money market works close. The withdrawals from banks have about ceased, and no further trouble is looked for in that direction. Merchants report that remittances are free from all sections of the State, but with the retail trade buying is in as small quantities as possible. This applies to retail merchants who are not compelled to carry much of an increase in their stock during the winter months. It is thought that after election the money market will show more general ease. The money markets at the East are gradually working easier. The heavy imports of gold from Europe have had a beneficial effect, as has an active and higher market for railroad and industrial securities. The close money markets compelled wheat growers in the great grain growing States to sell their wheat so as to pay their debts. This has helped collections and tended to ease the money markets.

New York Silver Prices.

NEW YORK, Sept. 10.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	30⅝	66¼
Saturday	30⅝	66¼
Monday*	....	....
Tuesday	30⅝	66¼
Wednesday	30½	66¼
Thursday	30½	66

*Holiday.

	Copper.	Lead.	Iron.	Tin.
Friday	10 65	2 70	10 25@12 50	13 30
Saturday	10 65	2 65	10 25@12 50	13 30
Monday*	....	....	....@....	....
Tuesday	10 65	2 75	10 15@12 50	13 25
Wednesday	10 65	2 75	10 15@12 50	13 25

*Holiday.

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	Par
New York Telegraphic Transfer	Par
London Bankers' 60 days	$486
London Merchants	$4.85
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	66¼
Mexican Dollars	51½c

Eastern exchanges are nominal.

SILVER.—For over one week or up to Tuesday the price of silver did not change either at the East or in Europe. This is something unusual and therefore causes remarks. Although the close is weak and lower the impression prevails that the selling pressure in America has relaxed and that large dealers and speculators are only waiting election developments in this country before doing more business. The demand for the Orient is light. From this port no silver was exported to Japan in August but China took $274,371 worth.

Pixley & Abell of London report shipments of silver to India, China and the Straits for the year 1896 to September 1st, as follows, as compared with the corresponding period of 1895:

	India.	China.	Straits.	Total.
1896	£2,400,278	£574,413	£545,686	£3,520,377
1895	2,410,880	1,175,767	541,503	4,128,150

MEXICAN DOLLARS.—The demand is light and market easy, with the supply liberal. There were 156,898 dollars exported to China in August.

COPPER.—Business continues light. The markets at the East did not change the past week, so far as quotations are concerned. The New York market is reported by mail advices: New business for foreign account has been very light, to all accounts, and orders from abroad are light at present, with bids higher than the basis of 10½c for Lake Superior ingot strictly the exception. Home consumers continue to buy in strictly hand-to-mouth way and apparently appear wholly indifferent about the future of the market. In the London market prices have ruled somewhat lower and merchant bars were down to £46 17s 6d at the close; speculation there has moderated considerably, but most accounts have it that European consumption continues heavy.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER.—The market is steady. The exports by sea in August were in flasks, as follows: To Mexico, 195; Central America, 115; British Columbia, 6; New Zealand, 10. The exports from January 1 to September 1 were, in 1896, 9869 against 8304 in 1895.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export quotations are nominal, but less than for home.

LEAD.—There is nothing new to report. The markets at home and abroad are firmer owing to an improved inquiry and lessening supplies.

Our market is quoted as follows:

Pig	—	@	3 60
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—Demand shows a steady increase.

Drop, sizes smaller than B, per bag of 25 lbs			$1 20
Drop, B and larger sizes,	"	"	1 45
Buck, Balls and Chilled, do,	"	"	1 45

TIN.—There is a light demand. The market is barely steady for both pig and plate. At the East the markets are reported slow and in buyers' favor.

The market is quoted as follows in jobbing lots:

Pig, per lb			14
Plate, I C coke, heavy, per box	$4 10	@	—
" " " light, "	4 00	@	—

ANTIMONY.—The demand is fair, with the market steady at 7¾@8½c in a jobbing way. New York mail advices quote 7⅞ for Cookson's, 6½c for Hallett's and 6½c for Japanese, from store.

BORAX.—There is nothing new to report. The market is quoted as follows:

Refined, in car lots	6⅜
Refined, in sacks	5⅝
Powdered, in car lots	5¼
Concentrated, "	5⅝

POWDER.—The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" " No. 2, " "	8½c

IRON.—The local consumption continues fairly free. A New York exchange says: "It is rumored that the certain interests not wholly unknown in quarters where statistics of metals are handled, have a great scheme in hand to promote speculation in American pig iron warrants at prices lower than those at which cash buyers can purchase actual iron. Confirmation of this was wanting, but that effort is under way to arouse speculation is morally certain."

Our market is quoted as follows:

	To Arrive.	Spot.
AMERICAN.		
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00
ENGLISH.		
Barrow	$21 00	$23 50
Gartsherrie	21 50	23 50

Bolt.....¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing..... 20

COAL.—The demand is essentially unchanged. The market is in buyers' favor for all kinds except English, which are held fairly steady.

COKE.—The market is quoted as follows:

Gas Companies'	—	—	— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—The demand is dull for home and fair for export.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is barely steady.

The market is quoted as follows:

Wire, carloads, basis per keg			$3 20
" jobbing, " "			3 30
Cut, carloads, " "			2 95
" jobbing, " "			3 05

Mining Share Market.

SAN FRANCISCO, Sept. 10, 1896.

The market has been fairly dull and active by turns with the middle shares the leaders. The most pronounced advance was made by Chollar and Hale & Norcross. The former sold up to $2.45 and the latter to $1.55. This move is said to have been made chiefly by a few short sellers filling assisted by some outsiders going long. After these purchasers a raid was made on the Gold Hill shares causing Confidence to decline to $1.40 against sales at $1.65 on Friday. In the decline the entire list sympathized, going off from 5 to 15 per cent At the lower prices strong buying orders came in for the north end shares which steadied the market only to weaken again on Tuesday under a bear raid and some realizing by the longs. During the recent depresssion, the manipulators are said to have secured a large line of shares and it is but natural they should try and market them at an advance, but whether they can do so before election remains to be seen. From an outside point of view it would seem as if the times are against a successful deal unless it is the intention to make a small upmove on reported ore strikes and new work started in two or more of the mines. There can be no doubt that the money market is working close, and it is stated that only one bank gives accommodations to brokers to the extent which obtained some months ago. A close money market is always against a deal. There is another thing against it, viz.: an exciting presidential election and also the general public having lost heavily by dealing on the long side, will be slow to come in particularly moneyed outsiders. While saying this it must be conceded that the work going on in the mines on the Brunswick lode and several of them on the Comstock lode, is of quite an important and interesting character. From its nature one or more strikes of ore are liable to be made any day and as shares are said to be scarce, owing to so many having been paid and drawn out of the market, a quick upmove would result, to be followed by the usual slump unless there should be a sustaining moneyed power in the market, which there does not appear to be.

The following mining companies report having had money on hand Sept. 1, 1896, as per sworn statements filed in their offices this morning: Alta $2858.54, Andes $5719.98, Alpha Consolidated $359.17, Belcher $2871.96, Best & Belcher $18,220.44, Bodie Consolidated $1192.65, besides the bullion product of the mine for August to be received, Bulwer Consolidated $6224.61, besides bullion to be received, Bullion $1484.91, Caledonia $4301.65, Con. California and Virginia $7842.09, besides unsold bullion of the assay value of $42,885.93 at the Carson Mint, Confidence $1169.97, Church $8404.60, Chollar $20,296.95, Con. Imperial $3885.07, Challenge Consolidated $359.29, Con. New York $1587.12, Crown Point $1587.12, Exchequer $1664.33, Hale & Norcross $2312.53, Julia Consolidated $113.94, Mexican $7320.31, Mono $2129.32, Ophir 20 cents, with an assessment of 25 cents per share being collected, Overman $7594.65, Potosi $3994.36, Savage $5508.42, Sierra Nevada $1694.25, Silver Hill $1026.45, Silver King $1727.84, Standard Con. $21,507.45, Syndicate $653.37, Union Con. $2093.51, Utah Con. $847.86.

The following mining companies report having had an indebtedness Sept. 1, 1896: Gould & Curry $154.13, Lady Washington $146, Occidental Con. $1710.13.

From the Comstock mines our advices, as a whole, are of a more encouraging character, but experience teaches caution and not to place too much confidence in favorable prospects. For several years good news and work in the right direction have been followed by dismal failures, low prices and the public holding the shares and the insiders the coin. It is to be sincerely hoped that the present favorable conditions at the mines will prove an exception to what has been for several years past, and that one or more bodies of ore will be found. In the north end mines they are running a north drift and an east crosscrift on the 900-foot level. In Utah they are driving a west crossdrift from the south drift run from the old west tunnel. In Andes they are working on the 450-foot level. In Sierra Nevada they are running a north drift from the Layton tunnel workings. In Mexican they are driving ahead on a north drift from the west crossdrift on the 1000-foot level. In Ophir there is an improvement in the west crossdrift on the 1000-foot level, with a slight seepage of water coming in. They are also working west on the old Central tunnel level. Advices from Con. Virginia are of a hopeful character, but the work on the 1000-foot and 1650-foot levels is largely a gamble, with the chances against finding a large body of good ore. They raised from the 1750-foot level 165 tons of ore, assaying over $45 a ton by car sample. The ore milled by the company shows careful treatment, which gave a good percentage, but everyone expects to find honesty with the Con. Virginia people. In Best & Belcher and Gould & Curry they are still driving the east joint crossdrift from the Bonner shaft. From Savage the news is the same as heretofore made public. In Hale & Norcross there is an improvement in the ore streak found on the 900-foot level. They are still working on the 450-foot level in Chollar. They raised last week 102 tons of ore and milled 360 tons. In Potosi they are working on the 450-foot level. The long west crossdrift in Bullion is being driven slowly ahead.

From the Brunswick lode our advices are to the effect that in Occidental they are working on the same levels reported last week, and that the ore in the winze below the 750-foot level is 2 feet wide and the vein looks well. In Chollar, they are raising from the 200-foot level towards the Potosi line for surface connection, so as to get ventilation. They made a 50-feet drive the past week; this is fast work. On the 300-foot level they are still pushing the south drift ahead. In Hale & Norcross they are ready to start the south drift on the 400-foot level. They will have to run it over 100 feet before they get to the Chollar line. If they find more ore in Hale & Norcross on this level than was found on the 300-foot level, the shares ought to show considerable life. They are running an east crossdrift on the 300-foot level. In Gould & Curry, Best & Belcher and Con. Virginia the work is essentially unchanged.

The market opened this morning dull and fairly steady. After call there was a slight advance, which was followed by lower prices. The trading public are bearish and sell on every little up. The south drift on the 400-foot level of Hale & Norcross was commenced today. By October 1st they will be up to the Chollar line, when the drift will be taken up by the latter company. Usually well-informed miners are watching with considerable interest the work on the Comstock lode that is being done by Con. Virginia, Chollar and Hale & Norcross. The former company will run for the old "burnt ground" now that the gas is said to be out. Official letters from the Gold Hill mines filed to-day do not give any different news from what was published in this department last week. The official letter from Savage is long, but does not give anything new. From the Bodie mines the news is of the same character reported last week. The work in the mines in this district is being closely watched by mining men.

The following illustrates the changes of the week:

MINES.	Sept. 3.	Sept. 10.
Alpha	$ 17	$ 17
Alta Consolidated	12	07
Andes	31	....
Belcher	30	59
Best & Belcher	1 10	1 10
Bodie	75	....
Bullion	....	09
Challenge	61	51
Chollar	2 20	2 30
Confidence	1 65	....
Consolidated California and Virginia	1 85	1 90
Consolidated New York	....	....
Crown Point	33	34
Exchequer	....	....
Gould & Curry	58	61
Hale & Norcross	1 50	1 50
Justice	....	....
Mexican	60	62
Ophir	1 00	1 15
Overman	....	....
Potosi	96	1 00
Savage	58	66
Sierra Nevada	48	77
Union	....	46
Utah	....	10
Yellow Jacket	38	36

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and	Sale.	Secretary.
Alpha Con M & M Co, Nev	17	10c	Aug 3.	Sept 7.	Sept 29.	C E Elliott, 309 Montgomery
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24.	Sept 24.	Oct 24.	E D Farish, 632 Market
Anita G M Co, Cal	10	7c	July 20.	Aug 25.	Sept 15.	L F Reichling, 404 Montgomery
Bay State M & D Co, Cal	33	3c	Aug 21.	Sept 30.	Oct 20.	F E Luty, 330 Pine
Bullion Mining Co, Nev	42	10c	Aug 14.	Sept 15.	Oct 8.	R R Grayson, 331 Pine
Belcher S M Co, Nev	53	25c	Aug 5.	Sept 10.	Sept 30.	C L Perkins, Mills Building
Confidence S M Co, Nev	27	30c	July 30.	Sept 3.	Sept 24.	A S Groth, 414 California
Con Imperial M Co, Nev	37	1c	July24.	Aug 27.	Sept 22.	C L McCoy, Mills Building
Crown Point M Co, Nev	68	20c	Aug 18.	Sept 23.	Oct 13.	J Newlands, Mills Building
De Soto G M Co	1	7c	Sept 7.	Oct 10.	Nov 9.	E H Clark, Mills Bldg
Gold Bar Con M Co, Cal	4	2c	July13.	Aug 20.	Sept 21.	E C Godfrey, Crocker Bldg
Quaker G M Co	40	12c	Sept 7.	Oct 8.	Nov 5.	C W Poindexter, 418-420 Market
Gould & Curry S M Co, Nev	79	15c	Sept 1.	Oct 5.	Oct 27.	A K Durbrow, 309 Montgomery
Jamison M Co, Cal	8	5c	July 6.	Sept 7.	Sept 28.	Sam W Cheyney, 120 Sutter
Occidental Con M Co, Nev	24	10c	Sept 2.	Oct 8.	Oct 29.	A K Durbrow, 309 Montgomery
Reward G M Co, Cal	1	3c	Aug 8.	Sept 14.	Oct 5.	J Stadtfeld, 309 Montgomery
Sierra S M Co, Nev	111	25c	Aug 7.	Sept 11.	Oct 1.	E L Parker, 309 Montgomery
Union Con S M Co, Nev	53	20c	Aug 25.	Sept 28.	Oct 22.	A P Swain, 309 Montgomery

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Grant Gold Mine	S. R. Thorne, 64 Chronicle Building	Sept 14
Gray Eagle M Co, Cal	W J Gurnett, 308 Pine	Sept 16
Mono G M Co, Cal	J W Pew, 310 Pine	Sept 17

San Francisco Stock Board Sales.

SAN FRANCISCO, September 10, 1896.

9:30 A. M. SESSION.

100 Alpha	17	300 Occidental	59
600 Belcher	59	400 Ophir	1 15
100 Best & Belcher	1 10	200 Potosi	1 00
200 Bullion	09	700 Savage	66
100 Challenge	47	200 Sierra Nevada	77
100 Chollar	2 30	50 Union	46
75 Con Cal & Va	1 90	200 Utah	09
100 Crown Point	34	400 Yellow Jacket	36

SECOND SESSION—2:30 P. M.

50 Ophir	1 10	500 Sierra Nevada	76
300 Mexican	60	500 Utah	10
200 Gould & Curry	61	200 Alta	07
100 Best & Belcher	1 10	200 Challenge	51
50 H. & N	1 50	300 Bulwer	47
250 Belcher	58	300 Mono	20

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California Gold Quartz Mines

On and Off of the Mother Lode.

$5,000 to $1,000,000.

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FOR SALE.

ONE KNOWLES VERTICAL SINKING PUMP.

Capacity, 12,000 gallons per hour; in perfect order. Will sell at half price. Address

P. ODERMATT, Boiler Works,

58 & 60 Bluxome Street, San Francisco.

FOR SALE CHEAP.

8x12 Wheeler Rock Crusher; 10 H. P. Ames Portable Engine; 5 H. P. Upright Boiler and Engine. All in Perfect Order.

RILEY, 1202 Mission Street, San Francisco.

Recent California Mining Incorporations.

New Victor Gold Mining and Milling Company, San Francisco; L. M. Howard, San Francisco; E. J. Parrish, E. Tyler, C. E. Smith, Thomas Rogers, Mountain View; Mrs. M. Oldham, Gilroy; Mrs. D. Keller, Watsonville; capital stock $100,000.

The Marble Creek Placer Mining Company; A. Burnbrazer, G. Burbeck, A. M. Benham, S. L. Potter, W. G. Hawkett, J. S. Anderson and R. B. Snell; capital stock $100,000, all subscribed.

Golden Ancient Channel Mining Company, San Jose; F. J. Smith, J. M Haskins and P. C. Smith, Evergreen; T. A. Rogers, Mountain View; R. Fisk, Edenvale; J. H. Challen, Spanish Ranch; G. H. Salisbury, San Jose; capital stock $100,000.

Junction Mining Company, San Francisco; W. H. Storms, C. G. Yale, H. S. Durden, W. A. Hall and R. S. Clark; capital stock $100,000.

Recently Declared Mining Dividends.

Morning Star Mining Company, Colfax, Cal., $5 per share. Payable Sept. 1.

The Jackson Mining Company of Eureka District, Nevada, 10 cents per share. Payable immediately.

The Aetna Consolidated Quicksilver Mining Company of California, 10 cents per share, amounting to $10,000. Payable Sept. 10th.

Mammoth, Utah, $20,000. Payable Sept. 1. A total of $1,110,000 to date.

Silver King, Park City, Utah; $37,000, payable Sept. 7th; a total to date of $787,000.

Calumet & Hecla, Michigan; $500,000, payable Sept. 25th; a total of $2,000,000 this year to date and $46,350,000 since organization.

Commercial Paragraph.

THE Fulton Iron Works are putting in the machinery of a new steamer temporarily named the James Spiers, which has been built for the Inter-Island Steamship Company of Honolulu. She is schooner riggged, 195 feet over all, 34 feet beam and 15 feet deep.

Assessment Notices.

ANCHOR COAL AND DEVELOPMENT COMPANY. Location of principal place of business, San Francisco, California; location of works, Kelso, Cowlitz county, Washington.

Notice is hereby given that at a meeting of the Board of Directors held on the 24th day of August, 1896, an assessment (No. 7) of Three Cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market Street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-fourth (24th) day of September, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the twenty-fourth (24th) day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. D. FARISH, Secretary.

Office—No. 632 Market Street, Room 5, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the first day of September, 1896, an assessment (No. 79) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the fifth (5th) day of October, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 27th day of October, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69 Nevada Block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 2d day of September, 1896, an assessment (No. 24) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of October, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 29th day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

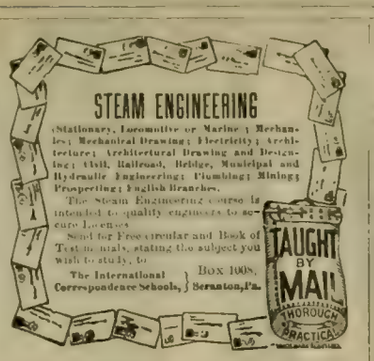
By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from W. A. Keefer, in the Alcyone Mine, near San Andreas, Calaveras Co., to deposit tailings in San Domingo Creek, and from J. R. Sears, in the French Claim, near Indian Diggings, El Dorado Co., to deposit tailings on the bank of Clear Creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on September 14, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from W. H. Leek, in the Miocene mine, near Crescent Mills, Plumas Co., to deposit tailings in Rush creek; from Hugh Craig, in the Casajo mine, near West Point, Calaveras Co., to deposit tailings in the middle fork of the Mokelumne river; and from John Faubel, in the Mad Mule mine, near Stella, Shasta Co., to deposit tailings on the bank of Whisky creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on September 21, 1896, at 1:30 P. M.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DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Cert.	No. Shares.	Amt.
E. C. Cain	170	2,500	50 00
E. C. Cain	171	2,500	50 00
C. L. Dingley, Jr	72	800	16 00
C. L. Dingley, Jr	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	169	3,803	76 06
E. C. Godfrey, Trustee	140	6,667	133 34
E. C. Godfrey, Trustee	166	1,333	26 54
E. C. Godfrey, Trustee	167	1,809	36 18
E. C. Godfrey, Trustee	141	1,667	33 34
E. C. Godfrey, Trustee	142	3,000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	83	2,000	40 00
J. F. R. Landis	138	1,000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6,000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2,500	50 00
Jos. A. Pratt	2	2,500	50 00
Jos. A. Pratt	3	2,500	50 00
Jos. A. Pratt	54	2,500	50 00
John E. Todd	5	2,500	50 00
John E. Todd	6	2,500	50 00
John E. Todd	9	2,500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

DELINQUENT SALE NOTICE.

THE JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, on Jamison Creek, near Johnsville, Plumas County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 8) levied on the Sixth (6th) day of July, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
A. Hall	112	2,000	100 00
John Sparks	164	1,000	50 00
John Sparks	165	1,000	50 00
John Sparks	166	2,000	100 00
John Sparks	167	1,000	50 00
John Sparks	168	1,000	50 00
John Sparks	169	500	25 00
John Sparks	216	500	25 00
Al. White	236	500	25 00

And in accordance with law, and an order from the Board of Directors, made on the 22nd day of July, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room 50, 120 Sutter St., San Francisco, California, on MONDAY, the 28th day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

SAM W. CHEYNEY, Secretary.

Office, Room 50, 120 Sutter Street, San Francisco, California.

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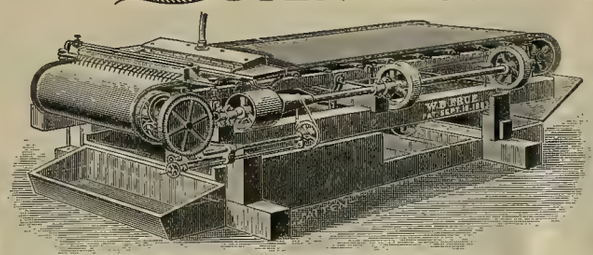

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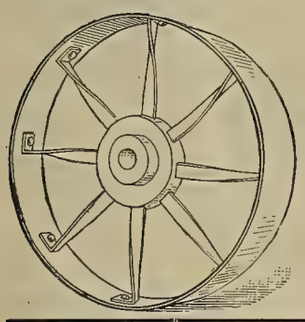

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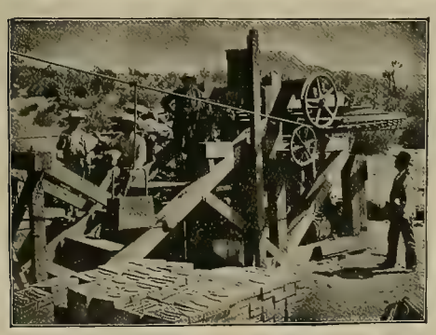

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No. 1889.—VOLUME LXXIII. Number 12. SAN FRANCISCO, SATURDAY, SEPTEMBER 19, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

The Inventive Faculty.

In a late issue of *The Engineer* of London there appears a reply to the criticism of that paper on the article, "Invention, the Indefinable Requirement of the Patent Law," which recently appeared in our columns. Some time ago W. H. Smyth of this city threw out the suggestion that, contrary to all accepted authority, the "faculty of invention" has no separate existence as a special mental endowment, but that "invention" is logical reasoning on the accumulated result of correct observation to the end of supplying a want; consequently that the varying capability of individuals in this particular is a difference in degree only, not one of special endowment. In all the criticisms and comments no one questions the correctness of his position, that much benefit must accrue from training the mind in the direction he suggests. Yet, as he points out, no special effort is made on the part of educators to cultivate those faculties which, whether or not employed in invention, are certainly of great value in all walks of life.

The power of reasoning logically on the results of direct observation is the foundation of all valuable work. Yet, what course of study is systematically arranged to cultivate these capabilities and their co-ordination? The practical and important essence of the discussion, apart from its bearing on patent law, seems to be: Are the faculties in question capable of being cultivated? If so, it is time that this matter receive the consideration of educators, especially in connection with industrial training, for more capital is to-day invested in the products of invention than in any other form of human endeavor.

Following we give extracts from Mr. Smyth's reply:

"It is such questions as these, involving fortunes, which are clustered thick around the interpretation of the word 'invention,' of which *The Engineer* says, 'It is a vain thing to attempt to say what is or what is not invention,' and of which 'it is by comparison easy to say what is, and what is not, invention.' Judge Shepley of the district of Massachusetts apparently takes issue with *The Engineer* on this subject, and on one or two other points, for he has said, 'No more difficult task is imposed upon the court in patent cases than that of determining what constitutes invention—not an invention, observe—and of drawing the line between invention and simple mechanical skill.'

"There never was a time in the history of human intelligence when the mind made bolder inferences or advanced from premise to conclusion with such sure-footed logical leaps and bounds than at present.

"The essential matters for which I am contending, and of the importance of which I have never been able adequately to express an opinion, may be summed up thus:

"That a 'faculty of invention' does not exist.

"That the faculties concerned in the production of new and useful constructions, etc., are not gifts fortuitously bestowed on favored individuals; in other words, inventors are not born specialized in any way more than lawyers, farmers, mechanics, etc.

"That 'invention' does not involve the spontaneous conception of ideas any more than living forms result from spontaneous generation.

"That 'inventions' are the material product of logical reasoning on natural objects and phenomena presented in suitable form by visual memory, having as objects the satisfying of existing wants.

"That the faculties employed are proper subjects for education.

"That, inasmuch as modern civilization is almost wholly based and dependent upon the exercise of the faculties employed in producing inventions, education to be in keeping with modern necessities should be directed systematically to their cultivation for this special purpose.

"That these ideas are diametrically at variance with popular ideas on this subject, and also with the interpretation of invention, etc., by patent offices and courts both in England and the United States, which is in effect that inventions are the product of a specific inventive faculty, and involve the spontaneous conception of ideas. That this faculty is isolated, sporadic and fortuitous in distribution, spontaneously creative in function, uncontrollable and irreducible to order or system, irresponsive to education and cultivation—a gift, a philosopher's stone, an Aladin's lamp.

"That the present interpretation of 'invention' is a source of increasing difficulty and confusion.

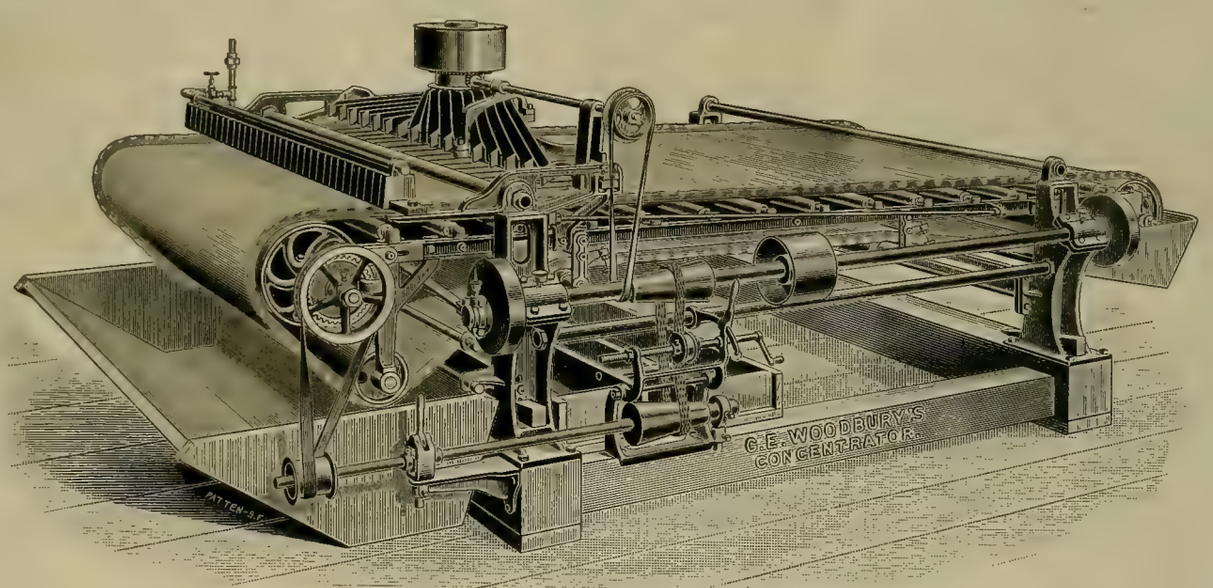
"That, whichever may be the correct view, the words 'discovered,' 'produced,' 'thought out,' 'reasoned out,' cover the same intent, and do not involve questionable interpretation.

"That consequently they are preferable substitutes."

A New Ore Concentrator.

The Woodbury improved side-shake concentrator, a cut of which appears on this page, is the result of the inventor's latest effort to produce a machine of high efficiency for saving concentrates. It is equipped with the Woodbury ruffled edge rubber belt, pulp distributor, adjustable cranks, and is well made in all respects.

The machine consists of an incline shaking frame or table supported upon four upright springs from the four upright corner posts. These springs give the shaking frame a peculiarly even motion that is necessary to give the best results in concentrating. A side shake or lateral motion is imparted to the frame by means of steel connecting rods attached to adjustable cranks. These adjustable cranks allow the operator to adjust the throw or movement of the shaking frame to any desired length, thereby adapting the movement to working different ores.



WOODBURY SIDE SHAKE VANNER OR CONCENTRATOR.

The belt is caused to travel continuously, or at will, by rotating the head drum, the power of which is transmitted by means of a flexible belt which does not affect the movement of the shaking frame. In cases where chains are used for feed work, being ridged, it pulls and jerks the shaking frame, causing the pulp to gather or bank up to the side of belt. The travel is under full control of the operator, and can be regulated to any speed, or started or stopped at will.

The distributing table to this machine is a very desirable improvement. It consists of a slowly revolving bowl or receptacle for the pulp. From the bowl the pulp is discharged in perfectly even quantities of both water and sand, through distributing channels to the whole surface of the belt, and does not allow the pulp to be distributed any more to one side than to the other, and this alone goes a great way to produce perfection of work.

One of these machines is on exhibition and in operation at the Mechanics' and Producers' Fair, now in progress.

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J. F. HALLORAN.....General Manager

San Francisco, September 19, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Woodbury Side Shake Vanner or Concentrator, 233. Works of the Big Cottonwood Power Company, 238

EDITORIAL.—The Inventive Faculty; A New Ore Concentra or, 233. Railroad Grants and Homesteads; Mine Promoters; Visiting Miners; Mine Owners' Sampling, 234.

SCIENTIFIC PROGRESS.—The Great Work of Preparing the Preliminary Plans for a Railway to Unite North and South America; New Method of Preparing Alloys; Photographing the Sun; One Hundredth Anniversary of the Invention of the Art of Lithography, 238.

ELECTRICAL PROGRESS.—The Big Cottonwood Power Company; Electric Light Bath; Purchase of Street Railway Lines in Mexico; Change in Power Stations; Scheme to Furnish Electric Power to the City of Mexico, 238.

MECHANICAL PROGRESS.—Value of Paints for Ironwork; Locomotive-Making Plant for St. Petersburg; First Consignment of Pig Iron from the United States to the Far East; New Departure in Shipbuilding; Aluminum for the Construction of Railway Passenger Cars; Aluminum Industry in the United States, 239.

PRACTICAL INFORMATION.—Miles of Railroad in the United States in 1896; Defects of Dry Photograpic Plates Due to Packing; Air Tester in the Zurich Industrial Exposition; The Morbid Habit of Dirt Eating, 239.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 242-43.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 250.

MISCELLANEOUS.—Concentrates, 235. Trail Creek Mining District, 236. Two Varieties of California Fissure Veins; Mining Geology of Cripple Creek, Colorado, 237. Statement of Railroads in Receivers' Hands, 238. Coast Industrial Notes; Recent Patents; Notices of Recent Patents; Personal; Obituary; Recently Declared Mining Dividends, 244.

Visiting Miners.

Great interest was taken in a recent report by the Mining Bureau pointing out that the number of working miners in California had doubled in 1895. The numbers given for 1894 were approximately 9000, and for 1895 about 18,000. While this result is gratifying, it is still more encouraging to look to the future, and possibly no surer index of that can be found than in the hotel registers of San Francisco during the past few months. San Francisco is the natural center of travel which focuses all interests on this coast and mine owners and mining superintendents have, to a certain extent, to make it their base of operations.

In the great volume of travel using the hotels at the present time at least every fourth or fifth man is in some way or another connected with the mining industry of the State. Two years ago this was different. Of course, the great majority of mining men who pass through the city come and go unheralded, but to anyone making a study of the matter it is evident that at present there is an unusual amount of travel upon the part of persons associated with the mining industry.

In studying the hotel arrivals there is an interesting point that presents itself. Our visitors are from the North and the South, the East and the West. Recently there have been arrivals, prominent and well-known mining men, from many quarters. London and Paris have sent their representatives. Boston, New York and Chicago have been well represented. More than one mining engineer from South Africa has come, as also have men prominent in the profession of mining engineering from Western Australia, Melbourne in Victoria, and the deep gold mines of Charters Towers in Queensland. All this portends something, and it seems to be that the moneyed powers of the earth are awaking to the fact that here in California is nature's greatest treasure vault, and that they must send out their most expert "cracksmen" if they wish to get at the contents. Another feature is this: One average mine cannot afford to keep the services of a highly-salaried official all to itself, nor is there work for one such man on one mine. As a consulting engineer his services are available for many mines and hence as a consequence corporations or syndicates owning the services of such men lay themselves out to acquire as much mining property as the services they have purchased can be utilized over. Large operators are not now content with a single mine—they want a district—a district which they can control for economical operations.

Amongst the known auriferous areas of the world there are few such existant outside California now available, and of these few none have the natural advantages California has to offer.

Mine Owners' Sampling.

There should be no good reason why a mine may not be sold, to an extent at least, by the samples of ore bodies as well as is coffee or wheat sold by sample in the markets of the world. But the average miner has a pernicious habit of taking samples that are worse than useless in that they deceive not only himself, but others, and lead to no good result.

By sampling is understood the final delivery to the assayer of a comparatively small proportion of ore which accurately represents a much larger body of the same material. That is to say, it will contain precisely as much or little of gold or silver as a ton of the rock sampled. The greater the proportion that is taken of the ore body the more likely it is that it will represent the average body. Haphazard and occasional sampling are worse than useless. They lead to great losses of valuable capital; frequently to a total abandonment of good properties, and, worse than all, to a false sense of satisfaction that discourages improvement by denying its necessity.

Samples ought to mean the average value of ore as mined, including whatever waste has to go with it; for it must be remembered that the main expense with our gold ore is in the mining and not in the milling, so that for this reason a sample ought to represent what is to be mined; whether all of it is put through the mill or not, ultimately, cuts very little figure.

The great trouble with the miner is that instead of taking an average by breaking down large amounts across the entire width of the ore that has to be mined, and then crushing and quartering that down, is very apt to take a few hand specimens that he considers will give about the average result. He should not trust himself in doing that for he is always liable to deceive even himself.

The difficulty the investor finds in telling whether a mine is worthy of examination on the basis of the price asked for it is the very fact that the owner seldom, if ever, takes the trouble to sample his own mine, and consequently many examinations are made of mines bonded on the basis of statements which are found not to be reliable, and sampling becomes a trouble and an expense to everyone, without resulting in a sale.

The prospective purchasers, if they have an extravagant statement placed before them, when they find that the exaggeration has been a gross one, are very apt to discard the entire property in disgust, even though it may still possess merit on the basis of more moderate value shown on examination. The same property, if carefully and accurately represented in the beginning, might have been favorably considered in the end; and so the mine owner should remember that it is a waste of his own time, and detrimental to his own interests, to have his mine examined and adversely reported upon. He should, if anything, discount what the expert will find in his examination. He can always be sure of the real value by sampling his own mine beforehand and presenting the simple fact without color.

Mine owners should remember that mines are not purchased in our day without thorough investigation. It used to be considered important to get proposed purchasers simply to entertain a proposition because the owners always hoped or expected that sanguine views might be taken and the purchase gone ahead with; now it is quite the contrary. Properties are subjected to the most careful scrutiny, and the mine owner would save himself and others a great deal of trouble, useless expense and a bad name for the property by being sure that the facts he represents are accurate and not exaggerated.

What we wish to impress upon California miners is the utter uselessness of making exaggerated statements in the present day in regard to mines. In a majority of cases this is done through ignorance of the condition of affairs. In many cases the owners do not know what sampling is. The result of it all is discouraging to investors, for so many mines are offered and so few taken. It has become so now that proposed investors refuse to go to the expense of making the examination, because the mines offered so seldom show the values claimed; and it is getting to be more and more the custom to insist that the owners shall stand the expense of examination in order to verify their own statements. This is placing a burden upon the mine owners that they should not bear, for, as a general thing, they can not afford it. However, they have brought it upon themselves, to a large extent.

Mine Promoters.

The average mine owner who wishes to sell is not as much given to looking carefully into the credentials of the promoters who come and offer to place his property as he should be. As a result many mines in this State are to-day tied up in the hands of men who will not only accomplish no sales but will retard their development for months or years.

Promoters are as useful and necessary to the mining industry as are brokers in the real estate business, but many men engage in the business without capital and without connection, and do much to bring the business into discredit.

Up into one of the mining counties about two years ago there came a young man representing one of the dailies of this city to write up the district as to its mines. He was to take in other counties, one after another, on his way. The good people of the county owning mines, knowing of their real value and being without sufficient capital to properly open them, saw an opportunity, as they thought, to induce capital to come to them. They suggested to the newspaper man that they would like to arrange for him to devote more than the allotted time to their county, and finally after correspondence with the San Francisco daily, did arrange for him to stay and send down not only columns but pages of honest account of the merits of the county as a place for mining investment.

In a very short time after their publication there came up a horde of promoters, who bonded many of the mines of the county. These bonds were as to term all the way from six months to two years, and they were made without any clause as to development work. It was not long before the good people of this county learned that they had been duped. The promoters were nearly all of the class that might compare to the better men of that business as the "curbstone" brokers to the men who pursue that calling with the backing of capital and have offices where they may be found. These "curbstone" promoters had no backing and were only hoping that a "boom" would bring them opportunities to place the properties they had obtained control of. None of the mines were placed, however, and the development of the county was delayed a couple of years.

All over California there are good mines tied up in this way in the hands of men who obtain bonds, not with a view to presenting the mines bonded to anyone in particular, but in the hope that some one may turn up with whom a deal can be made.

Railroad Grants and Homesteads.

A decision of importance to owners of lands covered by railroad grants has been rendered by the Commissioner of the General Land Office in Washington in the case of W. S. Wynant vs. the O. & C. R. R. Co. The land in dispute is in Josephine county, Oregon. In November, 1894, Wynant made application to homestead it, having lived on it since September, 1883. The land office at Roseburg rejected his application, claiming that the land was on an odd section, and conflicted with the railway grant. Wynant contested the right of the company on the ground that there was an old pre-emption filing against the land when the company's grant took effect, on July 3, 1883. The land office at Roseburg decided against Wynant. He appealed to the Commissioner of the General Land Office. The commissioner has reversed the land office decision and awarded Wynant the land, and says that since the Supreme Court of the United States handed down its opinion in the case of Whitney vs. Taylor, 159 U. S., 85, to the effect that "any filing of record against the land at the time the grant took effect on the land will defeat the grant," the land department has followed that rule. Any old pre-emption or homestead filing, although expired, will defeat the company's right to the land.

Concentrates.

SIERRA CITY, Sierra county, is now lighted by electricity.

A MOVEMENT is on foot to incorporate the town of Jackson, Amador county.

THE old Ruby mine of Sierra county, it is reported, will soon be reopened.

THE railway last week did away with the days of staging into Rossland, B. C.

THE Geldenhuis Deep Company in the Rand in South Africa has developed 900,000 tons of ore.

MAJOR NEWELL is about to put a 120 H. P. engine in his mine in Rogue river near Grant's Pass, Oregon.

IN the Swauk placer mining district, the oldest in the State of Washington, quartz mines are being developed.

THE breaking of the large spur wheel at the Federal Loan mine at Nevada City has caused a temporary shutdown.

IN the Yukon district at Miller's creek there are no saloons running, a miner's meeting having decided against them.

BAKER & HAMILTON, the owners of the Confidence mine in Tuolumne county, contemplate the erection of a 30-stamp mill.

DR. A. MCMAHON and A. McMahon Jr. are preparing to put a 10-stamp mill on the Live Oak and Minuet mine in Nevada county.

THE failure of the First National Bank at Helena, Mont., has caused the closing down of four mines and one mill at Rimini.

THE managers of the Sellick mine at Haywards, Mariposa county, have placed orders in this city for an extensive mining plant.

OVER $200,000 have been spent by the Creston-Colorado Company in Sonora, Mexico, in the past year in improved machinery.

A LEDGE recently encountered on the 1350-foot level of the Argonaut mine in Calaveras county is said to contain 12 to 13 feet of pay ore.

PLACERVILLE people are talking about the erection of an electric power plant near that place to supply the mines and others with power.

COAL has been discovered on the tract of land in Mendocino county belonging to the Slovenian co-operative colony that lately settled there.

A DISCOVERY of gold-bearing quartz in the San Rafael mountains near Las Olivas, in Santa Barbara county, has led to a rush of locators.

THE *Mountain Democrat* of El Dorado county suggests E. W. Chapman of that county as successor to President Neff of the State Miners' Association.

JUDGE H. G. BOND, of Seattle, has bonded the Cordwood Jim mine, adjoining the Treadwell property, on Douglas island, Alaska, for $130,000.

AMADOR COUNTY has placed on exhibition at the State Board of Trade rooms in this city an interesting collection of ores from the mines of that county.

THE July output of the Anaconda mines of Montana was 9,900,000 pounds of copper, or nearly 2,000,000 greater than that of the Calumet & Hecla of Michigan.

THE Zeila mine in Jackson, Amador county, paid its employes in silver last week for the first time under its present management. About $10,000 in silver was distributed.

THE Butte County Miners' Convention will be held in Oroville on Tuesday, September 29th, when delegates to the State convention, to be held in November, will be chosen.

AN English company which had purchased twenty-five mines in the Picacho basin, adjacent to the Goshen mine of the Jayne group, will put up a large mill on the Colorado river.

THE three United States mints coined $2,650,000 in standard dollars in August, the largest amount in a long time. For July this coinage was $1,062,000. The gold coinage for August was $3,315,000.

IT is reported that the asbestos lead discovered in Keystone mountain in British Columbia is 100 feet wide and can be traced three miles. Asbestos has been found in the Province only in north Kootenay.

THE property owned by the Lydenburg mining estates in the Transvaal comprise 32 farms and several blocks of claims on the gold belt, covering an area of 200,000 acres, or nearly 300 miles, in an almost compact block.

ANSON PHELPS STOKES of New York recently purchased a building in Austin, Nevada, and placed the property in the hands of a Board of Trustees, adding his check for $1000, all to be converted into a public library for the town.

THE cyanide mill recently erected by the Dexter Company at Tuscarora, Nev., to work the old mill tailings, is in operation. It is said that these tailings carry $25 in gold, and the plant is saving $20 per ton, at a treatment cost of $1.25.

THE Taylor Park Mining Company of Gunnison, Col., is building a 17-mile ditch to work placer ground. The size is 14½ feet wide on top, 10 feet wide on the bottom and 6½ feet deep, and, it is estimated, will carry 8500 miners' inches.

THE old Pegleg mine in the Mohave desert has again been discovered, and it will without doubt be discovered occasionally for the next hundred years. So will the Gunsight. The fact that these supposed mines are in almost inaccessible places is very much in their favor.

THE Denver *Republican* gives a list of thirty-five leading Cripple Creek mines with a total capitalization of $49,170,000. The shares in these companies at the present selling prices would bring $11,269,850. There are in all about 300 companies and about half as many mines owned by individuals.

THE Yreka *Journal* says: "The mining industry of Siskiyou is advancing every year, and if it continues to go ahead as it has during the past two years Siskiyou will be the leading mining county in the State. During the last year and a half capital has been drifting in and has found a number of good properties in the county. It is a noteworthy fact that, with the exception of Nevada county, Siskiyou employs more miners than any other county in the State. Most of these men are employed on their own claims and are a class that spend the money they make here in this county."

IN 1892 James F. Wardner shipped the first ore out of Slocan district in British Columbia at an expense of $100 a ton. The present cost of shipping and smelting is not over $25 and in a few years it will be reduced to a small proportion of that and low grade ores which would not now be handled will pay a large profit.

ZULULAND promises to become of some importance as a gold mining country. The number of prospecting licenses in force at the beginning of the year was 498, as against 297 twelve months earlier; the number of Europeans engaged in prospecting and mining was 264 against 13, and of natives 1115 against 370.

THERE are reports from Clifton to the effect that the companies are turning out more copper than ever before. Both the Arizona Copper Company at Clifton and the Detroit Copper Company at Morenci have added new machinery the present year, which enables them to reduce their ore at less expense than formerly.

AT Thiard, Idaho, Frank Jenkins recently ran into ore of too low grade to pay expenses, he called his men together and told them that he could not afford to pay wages, but offered to let them take the mill and mine for 60 days and run them on the profit-sharing system. Without any hesitation, the men accepted the proposition.

THE situation at Leadville, Colorado, is practically unchanged. A number of mines are filling with water and even if arrangements are made soon for a compromise, it would be a long time before some of these could start up. The president of the Leadville Trades Assembly says that the difficulty is not apparently nearer an end than it was months ago.

ONE effect of the Leadville strike has been an increase in the smelting rates of Cripple Creek ores, amounting to from 50 cents to $1 a ton. Rates now are $8, $8.50 and $9 a ton—a graduated advance from $8. The scarcity of iron and lead ores for flux throws the increased expense on the smelters, which they are put to in securing them upon the dry ores of Cripple Creek.

THE United States Sub-Treasury in this city recently received $1,000,000 in gold from the Sub-Treasury in Chicago. This shipment was made to partly offset the recent redemption of currency, which amounted to about $5,000,000 taken out in August. In July about $3,000,000 in gold was shipped to New York. At present there is about $40,000,000 in gold, silver and currency in the Sub-Treasury.

THE De Lamar mine of Lincoln county, Nevada, for which $3,100,000 was lately refused, supplies its mill with 200 tons of ore daily and has blocked out enough to keep it running for five years. From this output is obtained a monthly bullion product of $220,000. Under the law a tax of $3.30 upon each $100 of the net earnings is collected, each three months $2.90 of the amount being turned into the county treasury and 90 cents into the State treasury.

THE Spokane *Chronicle* says that miners and prospectors seem to be pushing farther and farther north year by year and from all reports it does not seem that they have yet come to the end of the great mineral belt that stretches away up through British Columbia. Some years ago missionary stationed at Kamloops discovered copper in a cliff west of the station and he had a tunnel run in a distance of twenty feet, but funds giving out the work was discontinued. During the past season considerable prospecting has been done in that locality.

THE Mono mine at Ophir, Utah, which was bought by W. A. Stephens many years ago for $400,000, was bid in at a receiver's sale recently for $350. This mine once contained a big body of horn silver ore, and was capable at times of earning $80,000 net profit per month. It was mortgaged to the Charter Oak Life Insurance Company of Connecticut, which put up the money for Stephens and others. Twenty-nine days after the new owners came into possession the vein disappeared, and although hundreds of thousands were spent in searching for it, it was never found.

IN the South Mountain district in Idaho, a Spokane company incorporated with a capital of $3,000,000, has secured possession of nearly all the old mines in the camp, including the Grand Central, Arthur O'Keefe, Boulder, Laura, Blackstone, Summit, Liberty, Monitor, Fanny Hunt, Virginia, Golconda, Laxey, Smelter, Nancy and Ella. South Mountain has large deposits of galena and lead carbonate ore, Its remotenesss from the railroad has heretofore made successful operation questionable, but with the building of the Owyhee railroad, now in progress, this only drawback has been removed.

MR. PAUL TAVES of Brazil, South America, is visiting Montana for the purpose of learning the latest and most successful method of reducing base and free-milling gold ores. Speaking of the mines of his country he says: "Gold is not the only resource of the country. There are the most marvelous iron mines there that I ever saw. Iron ore in some ledges is so nearly pure that taken from near the surface may be worked up with a forge. The iron mines are not developed to any considerable extent. There is no coal there and that is a disadvantage, as smelting of all kinds must be performed with wood."

THE *Record* of Park, Utah, says that almost every man who has been up Bingham canyon has noticed the spring just above main Bingham, the waters of which are strongly impregnated with copper, and if they had stopped to examine into this freak of nature they would have seen that some one had thrown into the spring a lot of tin cans and scrap iron, and that these are encrusted with a coating of pure copper, but further than this no effort has been made to recover the metal contained in the water. This to many seems strange, for in this spring is a fortune at a small expense for old iron; for, by running this metal-laden water through a series of sluice boxes loaded with old iron, the copper in the water would be precipitated upon the iron, and the product thus obtained would find a ready market at the refineries.

THE Salt Lake *Tribune* says that along the eastern border of Utah, in the Uintah and Uncompahgre Indian reservations, extending through some eighteen townships, there are extensive deposits of gilsonite, the purest known species of asphalt. A highly lustrous though fragile hydrocarbon, it can be used for many different purposes. It is, for instance, the most perfect electrical insulator yet known, a thin sheet resisting a current of 1200 volts. It makes a fine varnish, and is the only substance from which a teredo-proof paint can be made for sea piles. The enamel for patent leather shoes is made from gilsonite. It is thought that eventually a substitute for rubber can be made from this particular substance. It lies in veins of unknown depth, ranging from 1 to 12 feet in width, and extending in places for miles. The veins are very few in number.

REPORTS come from Montana that in the Old Faithful mine, near the town of Bannack, there has been made a discovery of very rich ore. A telegram says that the richness of the ore may be judged by the fact that 17 ounces of the rock yielded a quarter of a pound of gold, and it was not a picked piece either. It would be interesting to know what a picked piece would assay. However, it is interesting to calculate what the Old Faithful would turn out with a good supply of such ore. Say she produces 100 tons a day! At $150,000 a ton, that would mean $15,000,000 a day, or $105,000,000 a week, or $450,000,000 a month or about five billions a year. The late report of marvelous discoveries in Placer county in a San Francisco daily is thrown into the shade by this. One great advantage the Montana story has is the fact that it is too strong to be believed.

A REPORT comes from London that the dominant control Cecil Rhodes has exercised in South African affairs is gone, Rhodes himself being under pledge to come to England to be heard in defense of himself and the British South African Company. Now, it is said, Rhodes, usurping the functions of General Sir Frederick Carington, the commander of the British forces, is trying to make peace with the Matabele chiefs, and has offered them terms which General Carington refuses to accept, and generally deals with affairs in Rhodesia as if he were still master of the situation. The Matabele war, if it continues, will owe its continuance to differences between Rhodes and Carington. The former would make peace on conditions which leave a large portion of the natives armed; the latter on their unconditional surrender and disarmament.

"THE British Columbia mining industry is growing rapidly and must soon find a center. That center must be where there is capital to invest, and where investments can be regulated. The *World* believes that Toronto is that center for Canada. What is wanted is a mining exchange of first-class standing which will so carry on business that the great bulk of the transactions will be conducted under its auspices. Why could not the Toronto Stock Exchange enlarge its scope and try and capture the business? It is worth considering."—*Toronto World.* All right, Toronto. Go ahead and become "that center for Canada" if you can—it will help you and the mining districts, too. But please remember that Spokane is and always will be the center so far as all the new districts of the Northwest are concerned, not "for Canada," but for the whole investigating world.—Spokane Chronicle.

A CORRESPONDENT of the *Mining Investor*, of Colorado Springs, says of reports of mining companies, a subject upon which we wrote lately: "The issuance of reports by companies, monthly reports or even quarterly ones would put an end to a lot of the grumbling that is now going on and is only what the officers of mining companies have a moral right and, in lieu of an every day examination of the books, it would seem, a legal right to do. I think there is much wisdom expressed in the words of a correspondent who says: 'Cripple Creek authorities seem to find their only resource in rude and dogged silence. That is better than smooth lying—but not as good as fair, frank honesty to men who have trusted them with their money.' I do not admit, I am far from doing so, that Cripple Creek authorities in general find their only resource in rude and dogged silence. It is only a few that do so, but this letter is an object lesson of what is going on day by day. The whole is labeled 'no good' because of the actions of the few, the few in this instance being, unfortunately, some of the more prominent companies operating at Cripple Creek."

A TELEGRAM from Washington announces that the Treasury Department has been informed that there is likely to be much suffering among miners at Cook inlet, who are returning from the Alaskan gold fields, unless the commercial companies which took them north provide for their passage home. More than a year ago the Department notified the companies that hereafter the Government could not furnish transportation for these miners and that if the companies took the miners north they should look out for their return. Another telegram from Seattle announces the arrival there of 76 Cook inlet miners and that fully one-third of these paid their way out with money they had taken into the country. One of them said: "You can imagine the condition of the country when it is known that of the two saloons which started up there last summer only one is running. The other had to quit for lack of business. When a saloon will not pay in a mining camp it is a good indication of poverty." An estimate made places the cost of taking the miners in and out of the country for the season at $590,000, and the amount that would be taken out of the mines at $100,000.

THE Grass Valley *Tidings* says that within the last eighteen months five extensive gold mines have been reopened in the Grass Valley district, each with a past record as a bullion producer. Of these the Rocky Bar and Massachusetts Hill has an air compressor plant that has attracted the attention of the mining world. This mine produced over $5,000,000 from early workings. The Allison Ranch, which is now putting in an expensive plant, yielded $4,120,338 before being closed down. The Gold Hill mine, whose pumps are now in operation and which has a magnificent plant run by electric power, produced between three and four million dollars and has never been worked beyond 500 feet. The Bullion Consolidated is now down about 500 feet. It has in the past produced $395,825. The Crown Point has lain idle for years, but has just been started by a French company. This mine has produced $134,000. Add to the above the Brunswick, which has been put under more active management than formerly; also the purchase of new ground by the Omaha, which it is intended to develop. But with all these encouraging outlooks, this should not be considered a favorable camp for outside miners to come to. There is abundant labor at hand to do all the work needed.

Trail Creek Mining District.

The following notes on the Trail Creek mining district, in British Columbia, are taken from the report lately made to the Provincial Bureau of Mines by William A. Carlyle, provincial mineralogist:

Perhaps the greatest factor that will determine the progress of mining, and the realization of the wealth that undoubtedly is now locked up in these mountains, is the means of communication and transport. The ores must be carried to the metallurgical centers for treatment; and if this part of the industry is to be retained in Canada, Canada must assist in boldly advancing these means of communication to make easily accessible the coal fields and the mines from which the different classes of ore can be obtained, that separately are difficult to treat, but brought together and intermixed can be reduced at minimum smelter charges. Favored by the trend of the mountains and valleys, American railroads are rapidly entering from the south to transport Kootenay ores to the American smelters; but, notwithstanding much greater difficulties of construction, Canadian roads must be energetically built, and not only will more mines be opened up, but the large reduction works with the large employment of capital and labor will be mostly retained within this Province. Not only is the bulk of this ore being shipped to the south, but the large proportion of the fast increasing demand for mine and mercantile supplies is being satisfied by the cities on the other side of the border, with the result that a great revival in their business affairs has followed the opening up of these good markets in British Columbia, greatly due to the fact that orders can be now more promptly filled and forwarded from this source, this advantage more than counterbalancing the customs duties that are imposed upon imports. Not only this, but much of the mining machinery manufactured in eastern Canada, and now being extensively ordered, is being brought most of the way over American railroads.

The discovery, during the last two or three years, of large bodies of high-grade gold ores, in which dividend-paying mines are now being operated, is attracting the earnest attention of many mining men and capitalists of both America and Europe. Many claims at points in Trail Creek district are now being carefully examined and bonded or bought, which better means of access and egress, now projected or being completed, will render possible their being worked, and the principals or agents representing capital are investigating these new resources. The fact that men interested in the treatment of ores, or their transportation, on studying the conditions and possibilities now shown, have begun large undertakings, or are now planning them, is indicative that the future development of this part of the Province will be soon on an extensive scale, and of their confidence, based on experience, in the extent and value of its mineral wealth.

The concensus of opinion of many mining men who have studied the conditions and surface showings in this new camp at Rossland is to the effect that few camps have ever shown so many favorable indications that warrant the belief that, on further extensive, systematic exploration, other chutes of gold ore will be uncovered. Prospecting has disclosed these many parallel veins, varying in width when exposed from an inch to several feet, and it is believed that many more ore chutes will be found when these most promising surface indications are thoroughly exploited, for it is quite improbable that the large chutes of rich ore that have been shown on the surface by denudation will be found to be the only ones.

This district has now reached that stage when persistent, plucky development work, sustained by ample capital, must be done to prove up these many veins and surface showings; but a sufficient amount of working capital is demanded (*a*) because much of the rock is very hard to mine, necessitating good machinery to make proper progress (*b*), considerable or even extensive development work must be done in the search for more pay chutes (*c*), while the more or less faulted nature of the ground, though not serious, will complicate this work.

The output from Rossland this year will not show the predicted increase over that of last year for several satisfactory reasons, although there is now, without doubt, much high-grade ore in sight. In the first place, better and cheaper means of transport for ore are being awaited, as the shipping mines are now in such a position that they can afford to hold back their shipments for better rates. Again, the smelter at Trail has not until recently been in such working order as to be able to handle anywhere near the amount of ore it is proposed to treat, nor has the tramway yet the proper facilities for carrying away much ore, but both of these, in a short time, should be able to work up to a much greater capacity. In some cases shipments have been suspended on account of the properties being bonded, or until the completion of underground workings that will make mining more advantageous.

The camp is the scene of constantly growing activity. Much good exploring work has been begun, much more is being projected. Already five air compressor plants are installed, and six more are being put in, while larger hoisting engines and pumps have also been bought. Altogether, $175,000 worth of machinery and supplies have been ordered for this camp.

PRODUCTION.

Total number of tons smelted to July 1st, 1896...	27,085
" " of ounces of gold.....	45,234
" " of ounces of silver.....	67,763
" " of pounds of copper.....	1,265,362
" gross value recovered by smelters.....	$1,007,007

Average net values per ton—gold, 1.67 ounces; silver, 2.5 ounces; copper, 2.3 per cent; value, $37.18.

In the above returns the compilation was made directly from the shipping returns and books most kindly produced for inspection by the officers of the following mines that have shipped ore other than test lots: The Le Roi, War Eagle, Iron Mask, Poorman, Josie, Cliff and Evening Star, and the above results give almost the exact output of the mines at Rossland up to July 1st, 1896. The tonnage is the net, or with moisture deducted amounting to ½ to 1 per cent. The amount of gold and silver given is the actual amount allowed by the smelters, or 95 to 98 per cent of the assay value of the gold contents, and 95 per cent of the silver. The percentage of copper given is the assay value less 1.3, as in the general average value the copper assay would indicate 3.6 per cent of copper in the ore. The gross value includes smelter and freight charges. The output from the free-milling ores of the O. K. mine could not be obtained in time for this bulletin.

DIVIDENDS.

Le Roi.....	$175,000
War Eagle.....	157,500
Total amount of dividends paid to July 1st, 1896..	$332,500

The Trail Creek mining district is located in the southern part of West Kootenay, on both sides of the Columbia river, and along the international boundary line between Canada and the United States. Rossland, the chief mining center, has grown very rapidly to a town of about 4000 people, and is supplied with good hotels, two banks—the Bank of Montreal and the Bank of British North America—churches, stores, a water-works system, electric-light plant, three newspaper offices, postoffice, express office, etc., and is noted for the orderliness maintained by the Government officer, Mr. John Kirkup, and his subordinates, many of the chief elements of disorder usually found in a new mining camp being vigorously suppressed.

History.—Early in the sixties, the placer mines in East Kootenay having been discovered, E. E. Dewdney, now Lieutenant-Governor of British Columbia, was instructed to construct a trail entirely within British territory, through the southern part of the Province, as a passage to the north had been proved to be not feasible. In 1865 this trail, since known as the Dewdney trail, was finished, and in its course it passed about one mile south of the present town of Rossland on its way down Trail creek to the Columbia river. Early prospectors were attracted to the iron-stained cappings; but the low-grade surface rock discouraged them, while the means of getting such ore to smelting centers seemed quite out of reach. However, in 1889, Joseph Bourjouis located the first claim—the Lily May. In this year he located the Center Star and the War Eagle, while the Virginia and Idaho were staked by J. Morris. They also discovered the Le Roi, but forbidden by law to stake more than one claim on the same vein, this piece of ground became the property of E. S. Topping by his simply paying the expense of recording.

The Ore Deposits.—Mr. R. G. McConnell, of the Geological Survey of Canada, after a short visit in 1894, reported the country about Rossland to be "an area of eruptive rock, mostly diorite and uralite porphyrite cut by many dykes;" but as no complete geological survey has yet been made, nor any reported lithological study, only a very general description can now be attempted. The main mass of all the country rock is evidently diorite, although it presents many different gradations in composition and structure, varying from a fine-grained aphanitic rock with very little hornblende at one extreme to nearly massive hornblende at the other, often showing mica and pyroxene. Much of it looks like a basic syenite and samples have been taken for microscopical examination and later report, but the main point of interest is the fact that these ore bodies or veins traverse the diorite, although cores from the hanging and foot walls of the Le Roi chute will be examined, as well as samples from either side of the Center Star ore chute, so well defined in the cliff running up Center Star gulch, to ascertain whether these samples are all one class of rock or two. In going over this region the variations are seen to be very marked, in some places the rock being stratified as if of sedimentary origin, but in all probability a more or less altered eruptive. Porphyry dykes from one foot up to 60 and 80 feet wide traverse the country, many with a north and south strike, but with no apparent dislocation of the veins which they cut through. Indeed, at six such points of intersection the ore seemed to be concentrated, and even to follow along the dyke for some distance, but this must be made clear by further underground work.

In this Rossland ore much prospect work has shown clearly that there is a large system of lines of fracture with an east by west and northeast by southwest trend, and a persistent northerly dip, along which more or less ore has concentrated, either as bodies of solid sulphides or sulphides scattered through the country rock. Some of these fissures can apparently be traced through several 1500-foot claims, and along them are the large ore chutes now being mined or developed, the maximum width of pay ore so far being about 35 feet and maximum length 310 feet. Many of these fissures have been or are now being prospected, and in many instances with surface indications of the most unfavorable character the improvement has been very marked in the increase of the amount of ore and its value, and the great probability that more rich ore chutes will be found by following these fissures has made all such property valuable, and is deciding the commencement of extensive exploratory work. Again, large chutes of low-grade ore, mostly the coarse-grained magnetic iron pyrites or pyrrhotite, assaying from traces to $6 to $8 in gold, have been found and are being explored for better grade ore, and so far with some success. But development, except on a few claims, has hardly yet begun, and so far only the chutes that have been exposed at the surface are being worked, and it is yet impossible to foretell how much extensive underground mining will be rewarded.

The surface of these ore chutes is covered with the typical iron capping, or reddish brown sintery mass, and experience enables the prospector to distinguish between disintegrating sulphides and barren diorite heavily iron stained by the oxidizing of the bisilicates or the iron pyrites nearly always present in this rock. Although it is difficult to prospect such rock, which may be much iron stained but with no vein whatever in the vicinity, nearly all the work is done along one wall, and the ore appears to follow along one wall, where the rock is not too full of fissures that disguise true conditions, but it is doubtful if more than one wall ever really exists, although a parallelism of lines of fracture may for a short distance seem to prove the contrary. Wherever the ore is found to consist almost of pure sulphides, it will be found lying along and parallel to such a wall, after which ore is disseminated more or less through the inclosing rock, often following along small fissures that in some cases form small veins of good ore that run for a considerable distance away from the main deposit. In all the mines the ground is faulted, thus dislocating the ore deposits and stringers and complicating the search; but these slips will be better understood as work progresses, although much development work will have to be done by driving steadily ahead along the general course of the veins and crosscutting, for the good rule of following the ore is seldom possible for any distance by reason of these dislocations.

The Ores.—The ores at Rossland, with the exceptional free milling gold quartz of the O. K. mine, may be divided into three classes:

(*a*) Those large deposits of coarse-grained massive pyrrhotite, locally known as the "iron ore," in which very little or no value in gold is carried.

(*b*) The ore found in many claims on the south belt, as the Lily May, Homestake, Mayflower, Curlew, Gopher, R. E. Lee, etc., in which the sulphides are not pyrrhotite but iron pyrites and marcasite (white iron), with in some of these mines much arsenopyrite, and also zinc blende and even galena, in which case the silver value exceeds the gold and the percentage of copper is very small or nothing.

(*c*) The typical ore of the camp as sold by the Le Roi, War Eagle, Iron Mask or Josie is divided into first-class and second-class. The first-class consists of nearly massive fine-grained pyrrhotite and copper pyrites, sometimes with a little magnetite, or mispickel, with more or less quartz and calcite. In this class of ore, as got from the lowest workings of the Le Roi, the amount of quartz is much higher, the smelter returns giving 41 to 52.8% silica, and 20.6 to 26.8% FeO.; but this is proving the best ore in the mine, the average smelter returns were on 1200 tons 2 6 ozs. of gold, 1.8 ozs. of silver and 2 5% of copper, or $53.05* net per ton, while some shipments went as high as 4.06 ozs. in gold.

The second-class ore, and the bulk of the ore of the camp shipped, will be most probably of this character and value, is a diorite with a comparatively small percentage of these sulphides, but the value is still very good; 1800 tons of the Le Roi, second class, yielded by smelter returns an average of 1.34 oz. of gold, 1.4 oz. of silver and 1.6% per cent of copper, or $27.97* net per ton. Mr. Bellinger, of the Trail Smelter, kindly gave the average analysis of this ore to be FeO. 22%, SiO_2 42.5%, CaO. 7%, MgO. 3%, Al_2O_3 18%; copper, 1.5%, S. 6%.

Treatment.—The destiny of the mining operations of this part of the Province will depend, to a very great extent, upon the means of transportation, and then upon the cost of metallurgical treatment, for a large amount of low-grade ore is promised, and the possibility of treating such ores at a low figure to leave a fair margin of profit must attract the best endeavors of the metallurgist. The ores containing a high percentage of sulphides will be very desirable, and should command the lowest smelting charges, but in all probability the great bulk of the Trail Creek ores will be of the mixed class, or diorite, with a comparatively small proportion of sulphides, and

*Not deducting freight and treatment charges.

hence a low percentage of copper, while again the amount of arsenic, abundant in some of the ore, will be an important element. This ore has now been shipped to many of the American smelters, and now much will be smelted at the new works at Trail. The erection of smelters at Rossland in the immediate vicinity of the mines is being seriously contemplated, but it is yet too early to make any definite statement. The cost of freight and treatment is now about $10 to $14 per ton, when 95 per cent of the assay value of the gold and silver is paid for, and 1.3 is deducted from the percentage of copper present.

Of course, the possibility of other processes being suitable to such ores is being tested, such as the cyanide and chlorination processes, and the result will be awaited with much interest, as some such process may prove very successful, and all judgments should be deferred until the conclusive experiments have been completed.

Two Varieties of California Fissure Veins.

Although the gold quartz veins of California are, with few exceptions, well defined fissure veins, the few exceptions, or variations as they may be more properly called, are of interest because they present some unusual features. The deposits referred to are those associated with certain porphyry dikes. Mr. H. W. Turner,* in a recent paper, says:

Indeed, the field and subsequent laboratory investigations make it reasonably probable that some of the quartz veins along the mother lode have been formed by replacement of the feldspar of these dikes with silica. This is best seen in the neighborhood of the Tuolumne river, where these dikes accompany the lode at most points and are often filled with secondary quartz veinlets, dolomite and specks of iron disulphide. This is finely shown at the north end of the croppings of the Bachelor quartz vein on the north bank of the Tuolumne river, two miles southeast of Jacksonville. The vein lies at the contact of a body of serpentine on the west and a body of clay slate or schist, probably of Carboniferous age, to the east. The slates dip N. 30° E., at an angle of about 65°. The vein itself is composed of white quartz, dolomite and mariposite, a micaceous mineral often of a bright green color. Just east of the vein, in the clay schists within a width of thirty feet, are six or eight dikes. The dikes vary from two inches to two feet in width. Quartz veinlets, one with a convoluted course, cut both the schists and the dikes. Between the dikes and the ledge is a broken-up mass of the dike rock of a reddish-brown color, penetrated by quartz veinlets and seams of dolomite and apparently in a fair way to form a quartz vein, like that immediately west, if the alteration should go farther. This mass seemed a friction breccia and would indicate movement and faulting along the vein. A microscopic examination of this breccia showed it to be made up of fragments of the dike rock cemented by dolomite and quartz. Throughout the rock, as well as in the dikes just east, is scattered iron sulphurets (FeS_2) in minute specks. The brown color is due to abundantly disseminated limonite. The microscope shows the dike rocks, where not replaced by silica and dolomite, to be composed almost entirely of interlocking grains of feldspar with some larger twinned feldspars, in fact, identical as to composition with other similar dikes, which may be seen along the mother lode one mile to the northwest or about one mile due east of Jacksonville, and to the east of Moccasin creek on the south side of the river. Although the dike to the east of Moccasin creek contains at several points numerous quartz veinlets, at no point was there as good evidence obtained of the formation of quartz veins of some size by replacement of the feldspar of the dikes with quartz and dolomite as at the place just described, on the north bank of the Tuolumne river.

In the bed of Moccasin creek, at its mouth, is a large cropping of white granitoid rock. This is the north end of the Moccasin creek dike, which extends thence nearly or quite continuously southeasterly for about two and a half miles. It crosses the road to Groveland, about one-third of a mile east of the bridge over Moccasin creek. Except at the north end, it lies entirely to the east of the creek, gradually increasing in altitude and in distance from the creek to the southeast. This dike was first noted by the writer in 1886, but no investigation was made as to its nature. It is mentioned by H. W. Fairbanks in a paper on the "Mother Lode" (10th Ann. Rep. State Min. California, p. 45), but was called by him a granite dike, which rock indeed it resembles to the naked eye, and, as noted above, the north end of the dike is a soda-granite, as the term is used by Rosenbusch, or soda-granulite, according to Michel Levy. Specimens of this dike were collected at a number of points. The granitoid portion at the north end contains a good deal of quartz, and may be called a soda-granulite. It is composed of quartz, muscovite and albite or soda-feldspar. By far the larger part of the dike, however, is made up of albite feldspar only, and is mostly finer grained than the granitoid rock of the north end. It may be designated a soda-syenite (albitite) porphyry. Thin sections from different portions of the dike show a somewhat different structure and composition, but the variation is small. The porphyry is made up chiefly of the interlocking grains and prisms of albite, often untwinned, and in some sections there are definite phenocrysts of polysynthetically twinned feldspar (probably likewise albite) developed. Rather abundant in some specimens is an olive-green mineral, in grains and prisms. The extinction is sensibly parallel to the prism, and the interference colors are bright. Good cross sections showing beyond doubt the nature of the cleavage were not found, but so far as could be made out the cleavage is similar to that of ægirite, and it is thought to be that mineral. These dikes, therefore, show some analogy to certain dikes in Norway, described by Brogger, and called by him solvsbergite. The variety found near Lougenthal is composed chiefly of albite, but contains also microcline, hornblende (katoforite and some arfvedsonite), ægirite, traces of biotite, and quartz, accessory apatite, and zirkon, and occasional minute grains of a perovskite-like mineral.

Dikes of syenite-porphyry were also noted in some siliceous schists or thin-bedded quartzite of presumably Paleozoic age to the north of the Merced river. One of these dikes about nine miles southeast of Coulterville, in a much decomposed condition, can be traced for a mile or more with a strike to the west of north. The soft, decomposed dike material has apparently been auriferous, as numerous cuts have been made in it and claims located. As this particular dike was not investigated chemically or optically, it is quite possible that it contains some free quartz.

In the canyon of the Merced, on the steep slope west of the river just down stream from the mouth of the north fork, are from fifteen to twenty white dikes from six inches to six feet in width. These dikes are nearly vertical, following the dip of the schists (75° E.), but at other points cutting them at a slight angle. This group of dikes may also be called a multiple dike. A section from a similar dike, probably a continuation of one branch of the multiple dike, taken just opposite on the east side of the river, shows a few twinned needles of a pale-brown hornblende, and numerous idiomorphic phenocrysts of plagioclase in a microcrystalline granular ground mass of feldspar, muscovite and probably quartz, for the silica contents (71.88%) is too high for all the silica to be in the constituents already mentioned. In the table of albite analyses given in Dana's Manual of Mineralogy, 65% is the highest amount given, and it is therefore evident that if no more basic element than albite were present, the silica percentage could scarcely reach the amount found by Mr. Steiger in the rock. Nevertheless, no quartz was certainly microscopically determined in the rock. The feldspar phenocrysts are many of them twinned on the albite law giving symmetrical extinctions on the trace of the twinning plane (010) of from 6.5° to 21°, the average of nine crystals determined being 13°; none were detected showing albite and carlsbad twinning combined, so that the new method of Michel Levy (Etude sur la determination des feldspaths, 1894, p. 33) for determining feldspars could not be applied. From the lime percentage of the rock (2.03%) and from the general tendency of the more basic feldspars to crystallize first, and the apparent formation of epidote directly from the feldspar phenocrysts, it is presumed that they are near andesine in composition. The rock may be provisionally called a soda-granite porphyry.

Along the borders of the serpentine area from six to seven miles southeast of Coulterville are several soda-syenite dikes. Some of them follow quite closely the contact of the serpentine and the adjoining rock, which, to the east of the serpentine, is a greenstone (apo-augite-andesite) tuff and to the south is the same belt of siliceous Paleozoic schist or quartzite before noted. One of these dikes apparently forms the lode of a gold deposit, as it had evidently been mined. It is much altered in places, containing abundant quartz, calcite or dolomite, and sulphurets.

In another paper Mr. Turner describes altered porphyry dikes, composed chiefly of albite, as forming the lodes of the Shaw (Big Canyon) and Oro Fino mines in El Dorado county. The feldspathic nature of the Shaw mine was first suggested by Mr. C. A. Aaront in 1892. In describing it Mr. Turner says‡:

The deposits occur in clay schists associated with a dike or dikes of feldspathic rock. * * * The dike rock is more or less decomposed, and is at some points replaced by secondary white feldspar which at other points cuts the dike rock in little seams. This feldspar was determined to be albite. In two specimens of albite there is free gold.

In regard to the Oro Fino mine Mr. Turner says: * * * On the west side of Big Canyon creek is a dike of rock about 1500 feet long with a nearly south and north strike * * * the dike is much broken and recemented into breccia * * * it is auriferous * * * the country rock is clay slates; the same belt as the Shaw mine.

Somewhat related to these deposits are the true fissure veins which lie along or near similar dikes. The Sheep Ranch and Camp Seco mines in El Dorado county and the Black Oak mine in Tuolumne county may be cited as examples. In these cases the dikes are very little altered, but they are undoubtedly older than the veins, for they are often cut by small veinlets and small inclusions of the dike rock are found in the quartz. In this class of dike associated veins the relation is probably only structural and not chemical, also as in those described by Mr. Turner.

The dike represents a vent of eruptive rocks formed by some older fissuring. The fissuring which offered leeway for quartz deposition seems to have followed the dikes as a plane weakness, or rather of least resistance.

In the second variety the veins cannot be said to be more than ordinary fissure veins; in those described by Mr. Turner there has evidently been fissuring to allow the circulation of the solutions which replaced the feldspar of the dikes.

* Am. Geologist, Vol. XVII, p. 382.

† Eng. and Min. Jour., Nov. 19, 1892.

‡ Am. Jour. Science, XLVII, p. 470.

Mining Geology of Cripple Creek, Colorado.

Synopsis of Report of WHITMAN CROSS and R. A. F. PENROSE, JR., to the United States Geological Survey—By H. C. HOOVER.

Two well organized but unsuccessful attempts were made to find gold in the district previous to the discoveries made in 1891. The total production estimated by the mint from 1891 to 1894 was $5,543,967.

General Geology.—The group of hills containing the mines of Cripple Creek are almost entirely made up of volcanic rocks. The results of the investigation demonstrate that there was here a small vent, in and about which the sequence of phenomena has been remarkably complete and typical of a true volcano. The principal material is fragmental, resulting from a succession of explosive outbursts. Massive lavas occur, representing bodies that have been largely destroyed by succeeding explosive periods of the volcano, and other masses representing intrusive dikes and masses belonging to the later eruptions. The earliest lava was an andesite, which was followed by a great number of eruptions of phonolite. As the last products of the eruption, there are a number of basic dikes through the other lavas. The dying out of activity of the volcano was represented by much sofataric action and decomposition of the country rocks.

The formation through which this volcano burst, and upon which its superficial material lies, is the granito-gneiss complex of the Colorado range. These rocks have been much altered by the volcanic agencies, and have been intruded by many dikes of phonolite and allied rocks. The surface has been much changed by erosion since the volcanic activity.

Ores.—The ores consist of country rock more or less completely replaced by quartz, fluorite and other minerals in less quantities. The gold occurs free as tellurides of gold and possibly as auriferous iron pyrites. The free gold is derived largely from the oxidation of the telluride and in smaller amounts from iron pyrites. The tellurides are mostly calaverite, but sylvanite and other tellurides occur. Silver occurs in various forms, but in very small quantities. Superficial alteration has caused oxidation, hydration and leaching of some of the minerals, forming sulphates, phosphates and other oxidized compounds. The value of ores shipped from the district varies from $20 to several thousand dollars per ton. There are large bodies of low-grade ore—too low to work economically at present.

Mode of Occurrence of the Ores.—The veins occur in fissures, which lie in or near the above described area of eruptive rocks. These rocks overlie and partly surround a volcanic vent, and are themselves surrounded by granite. The fissures are usually represented by one main fracture, with numerous subordinate parallel fractures. They show some faulting and are considerably affected by the character of the country rock through which they pass. Veins do not occur in all fissures and the vein matter blends laterally into the country rock. The ore is due rather to replacement of the country rock than to the filling of open gaps. The veins frequently have definite relation to the dikes, generally because the vein fissures often follow the pre-existing dikes as planes of greatest weakness from former fracturing. The deposition of the ore in shoots is due in some cases to a restricted circulation of the ore-bearing solutions, guided by the more permeable places along fissures. In others it is determined by transverse fissures and a variety of minor causes. Most of the shoots found in the district reach the surface.

Source and Mode of Deposition of the Ores.—The gold and associated vein minerals are probably derived from volcanic rocks and to a less extent from adjoining granite and at considerable depths.

Practical Points for Miner and Prospector.—As the veins occur in great numbers, often a series of parallel veins, frequent crosscuts should be made in search of these parallel ore bodies. A very few miners have done this and some good mines have probably been abandoned for lack of it. Certain fissure planes are often regarded by the miners as walls and are supposed to be the side limits, beyond which no ore occurs. These "walls" often represent divisional planes in a zone of ore deposition and

should constantly be blasted into. A great deal of ore has been left from this delusion, only to be secured by much additional labor later.

Nearly all the pay shoots found in the district reach to the surface. It is, therefore, better to prospect the surface of a vein thoroughly before sinking. The error has repeatedly been made. Moreover, it is not safe to count on much better ore in depth than upon the surface, for, aside from some superficial leaching, there will probably be little increase in values. The gold ores are free within the zone of superficial oxidation, but will be in combination with tellurium and iron pyrites in depth. As the veins often follow dikes, it is well to examine the dikes for ore. The fissures, if not immediately upon the dikes, often run parallel with them, so that it is well to crosscut the surface in the neighborhood thoroughly.

In the above I have only given the general results and readers are referred to the original article for technical description of localities and fact bases of conclusions.

Scientific Progress.

AT the headquarters of the Inter-Continental Railroad Survey, in Washington, D. C., the great work of preparing the preliminary plans for a railway to unite North and South America has been going on in a quiet way for several years. The survey has been carried southward by Mexico and northward by Brazil, while the detailed connecting survey has been done in Central America by a detail of United States Army officers under the direction of Lieutenant Macomb. The results of the field work are now being reduced and computed. The extent of the survey involved geodetic work of magnitude, and the final results checked up in a most satisfactory manner. Many of the altitudes were first determined by the barometer, and the chosen altitudes were subsequently measured either trigonometrically or by spirit leveling, and the closeness which appeared between the barometric determinations and the subsequent measurements was gratifying to those who believe that the barometric method still has a future before it.

IN a memoir to the Paris Academy of Sciences, M. Moissan describes a new method of preparing alloys, especially of the refractory metals. He finds that by adding a mixture of the oxides of the metals and powdered aluminum to a bath of liquid aluminum, he is able to obtain alloys with molybdenum, titanium, tungsten, uranium, etc., the heat set free by the oxidation of the aluminum being sufficient to promote the reaction. Some of the alloys produced in this way may be found useful in the arts.

IF it be true that science advances through failures, the clouds which prevented the observation of the total eclipse of the sun on August 8 may be a blessing in disguise. During the past quarter of a century, several astronomers have taken up the problem of discovering a means of photographing the corona in broad daylight, but the results have not been very encouraging. In the photography of solar prominences, Prof. Hale and Dr. Deslandres have obtained distinctly valuable pictures, and, were it possible to delineate the corona with the same success on any day when the sun is shining, our knowledge of the nature of that solar appendage would increase much more rapidly than it can at present, when the only opportunities for studying it are afforded by the brief moments of totality of a solar eclipse. Perhaps this latest experience will induce solar physicists to give further attention to the artificial reproduction of eclipse conditions. It is, of course, not suggested that every-day observations will make eclipse expeditions unnecessary—there will be work for astronomers during solar eclipses for a long time to come; but if it were possible to carry out systematic researches on the structure and constitution of the solar surroundings, instead of depending entirely upon the rare intervals when the photosphere is obscured, several moot points might be settled before the end of this century. —Scientific American.

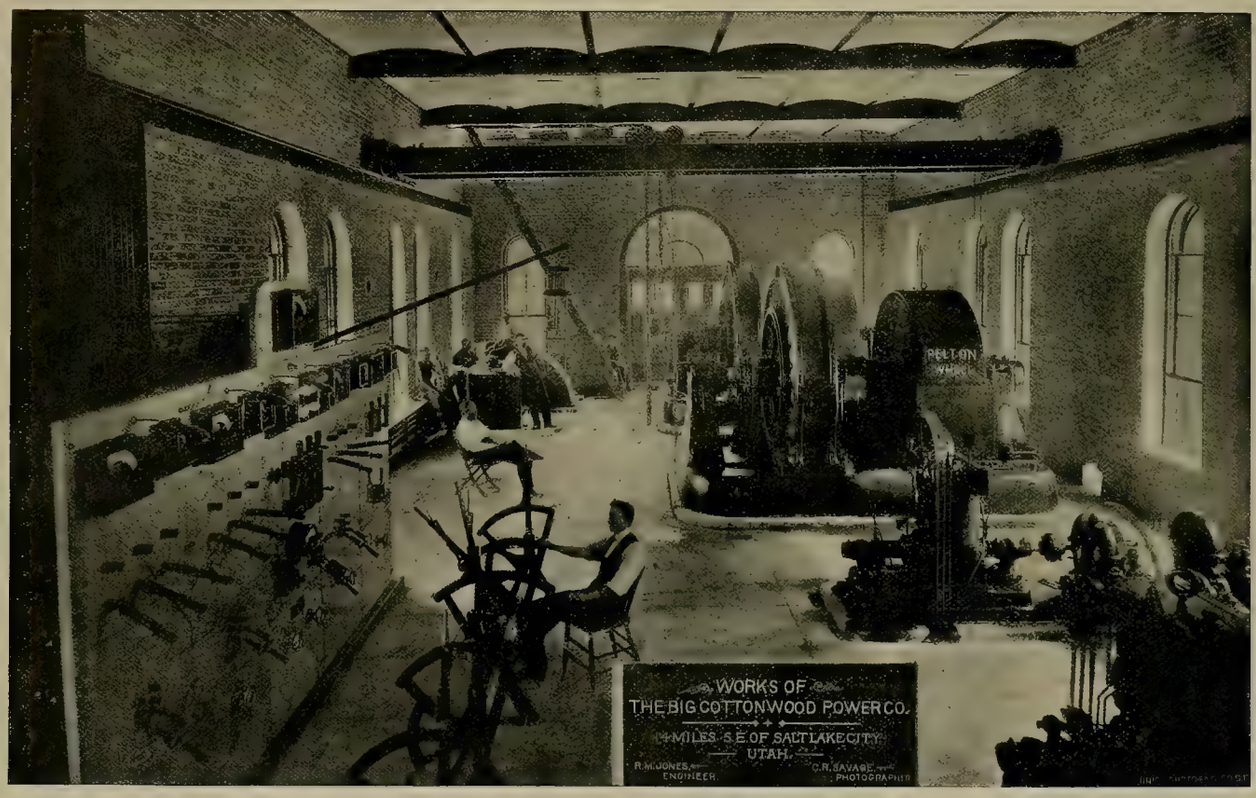
NEXT month in New York will be celebrated the one hundredth anniversary of the invention of the art of lithography by Alois Senefelder. The celebration will take place in the form of an exhibition of different products of lithography and will illustrate the history of the art from its birth to the present day. Specimens and prints from the earliest date and from all civilized countries will be shown. The exhibition will be open Oct. 16 and 17. Joseph R. Keogh, 142 Koscuisko St., Brooklyn, N. Y., is the secretary.

Electrical Progress.

The Big Cottonwood Power Company.

One of the most important electric power installations in the country is now in successful operation in Utah. It is located in the Big Cottonwood canyon, fourteen miles from Salt Lake City, the stream from which affords a supply of 4,000 cubic feet of water per minute at the lowest stage, which under the head available develops 2,500-horse power. The water is brought to the wheels through 2,400 feet of 50-inch pipe, made of plate steel varying from ¼ to ⅜ inch in thickness, made in sections of 32 feet, which are connected by steel flanges.

The power station consists of four 60-inch Pelton wheels with a capacity of 650-horse power each, running under 370 feet head at 300 revolutions. These wheels are direct connected to four General Electric generators, three-phase type, both mounted on the same bedplate. Special wheels are provided for running the exciters, which are also direct connected.



The power thus generated is transmitted to Salt Lake City and used for running an extensive system of street railways as well as for lighting and general power purposes. An additional water supply is available, which it is proposed to utilize later, increasing the capacity of the station to 5,000-horse power.

These works have involved an outlay of something over $500,000, all of which has been furnished by local capitalists. The company states that contracts for power have already been made, which afford a revenue of $100,000 per year, with a considerable surplus of power yet to be disposed of, which insures a dividend of not less than 20 per cent per annum over and above interest and operating expenses.

The financial as well as engineering success that has attended most enterprises of this character in various parts of the country, has given assurance of safe and profitable returns to all such investments where planned with proper reference to cost of installation and commercial value of the power produced.

AN electric light bath is now proposed to take the place of the steam room of the Turkish and Russian bath establishments, and if the hopes of the inventor are realized one may be able to indulge in the delights and benefits of a Turkish bath without suffering the discomforts of the suffocating department where one feels himself being cooked absolutely, in order to induce an excessive perspiration, says the Philadelphia *Item*. The invention consists of a cabinet lined within on all sides with large mirrors. Electric incandescent lamps are arranged about the inner walls in great number, and in such manner that their combined light and heat will be reflected by the mirrors in the center of the cabinet. A movable couch, to support the body of the bather in a reclining position, is arranged in the middle of the cabinet. This couch is provided with a glass top on which the bather rests, and a mirror chamber beneath the top. Incandescent lights are provided in this chamber so that their heat and light are reflected up through the glass top of the couch to the body of the bather. The inventor claims that with this apparatus induced perspiration is caused at a much lower temperature than is possible by either a Turkish or Russian bath, and also that it is much superior to said baths in the stimulation of protoplasmic activity and more powerful to promote the action of the skin and eliminate carbonic acid.

A COMPANY of American capitalists have completed the purchase of all the street railway lines of Monterey, Mexico. They will be converted into electric lines, thus providing Monterey with the first electric street railway system in the republic.

DURING the past three years there has been a marked change in power stations from a large number of small units to a smaller number of very large units with direct communication to the engines.

THERE is a scheme on foot to furnish electric power to the city of Mexico from peat beds, nine miles distant, owned by Boston interests.

THE *Railway Age* gives the following statement of roads in receivers' hands on June 30th last:

	No. Roads.	*Miles.*	*Capitalization.*
In hands receivers on June 30, 1895	169	37,855	$2,500,000,000
From June 30, '95, to June 30, '96	38	5,576	410,000,000
Totals	207	43,431	$2,910,000,000
Sold from June 30, '95, to June 30, '96	57	14,437	$1,009,899,000
In receivers hands June 30, '96	150	29,994	$1,900,101,000

Mechanical Progress.

AN account of some researches on the value of paints for ironwork, made by Professor J. Spennrath, has been published in the *Deutsche Banzeitung*. As one result of these, Professor Spennrath concludes that none of the metallic oxides commonly used combine chemically with linseed oil. The drying process depends exclusively on an absorption of oxygen by the oil, which is facilitated by the presence of the pigment in a purely mechanical way. The value of the different pigments used varies. Thus, zinc white, when used for outside work, rapidly swells to double its previous volume, owing to the absorption of carbonic-acid gas and water. Sulphuretted hydrogen will cause red or white lead to act in a similar way, but, when pure, these two latter pigments are satisfactory. Carbon paints are very stable, as in heavy spar, but the covering power of the latter is small. In order to test the relative durability of various paints, sheets of zinc were coated with a number of different kinds. The zinc was then dissolved away by acid, leaving a film of paint. All these films, it was found, could be destroyed by the action of dilute nitric or hydrochloric acids, while the vapors of sulphuric and acetic acids acted similarly. Alkaline fluids and gases also destroyed the paints rapidly. Pure water was found to be more injurious than salt water, hence the destructive action of sea water is to be attributed mainly to the mechanical effects of wash. Hot water was found to act more rapidly than cold. The most important discovery made was, however, the great influence of temperature. Films similar to those already described completely lost their elasticity and became brittle when exposed to a temperature of 203° Fahr. There was at the same time a large contraction. Similar effects are produced by prolonged exposure to considerably lower temperatures. Blistering he finds due to the inner coat of paint being so thick that it has not hardened thoroughly before the second coat is applied.

AN entire locomotive-making plant will be taken soon to St. Petersburg from Philadelphia, to be erected at Nijni-Novgorod, the commercial metropolis of the interior of the Russian Empire. Contracts for machinery for the plant amounting to over $500,000 were awarded to American manufacturers, most of them going to Philadelphia firms. The plant is to be built for the Sarmová Works, an extensive establishment engaged in manufacturing cars, steamboats, steam boilers and employing 5000 hands. The locomotive plant will have a capacity for building 200 engines a year, and will employ about 1000 hands. All of the foremen and engineers will be Americans. The buildings have been completed and are now ready to receive the machinery. The Czar has given valuable encouragement to the enterprise. Nearly 85 per cent of the railways in the Empire are operated by the Government, and the new company will get a great share of the work for them. The company will be known as the Russian-American Manufacturing Company. — Scientific American.

THE first consignment of pig iron sent from the United States to the Far East will be taken to Japan from Philadelphia. The iron came from Alabama. The Japanese propose to test the iron by using it in the manufacture of various kinds of ship and railroad machinery, and, if satisfactory, larger quantities will be ordered. Samples already sent there induced the purchase of the consignment, which was found to be superior to the European product. While the cost of the product is less than either the English or German product, the transportation charges alone prevent the driving from the Orient of all other iron.—Railway World.

RECENTLY there was launched at the Cail Engineering Works at St. Denis, France, a steamer which marks a new departure in shipbuilding. The innovation consists of the employment of a series of rollers on which the vessel proper is carried. The cabins, deck, and engines rest on a large platform supported by six huge hollow drums, which work in couples. There are four engines, developing altogether 200-horse power, which simultaneously drive the propeller and give a rotary movement to the drums. It is estimated that a speed of 25 knots will be attained. The length of the steamer is about 130 feet and her tonnage 280. She will be completed at Rouen, and will, it is anticipated, be ready for her trial trip in October.—Industries and Iron.

"SCHMALSPURBAHN," says the management of the French state railways has obtained permission from the minister of railways for the construction and reconstruction of a number of passenger cars in which all the parts formerly manufactured from brass, copper and iron, with the exception of axles, wheels, bearings and springs, brake beams and couplings, shall be constructed of aluminum. The weight of a car provided with aluminum trimmings was 1½ tons less than that of an old style car. It should be added that the French passenger coaches are much smaller than the American cars. As an ordinary train in France consists of 20 coaches the weight of the train would be reduced by 30 tons, which means a considerable saving in operating expenses.

ALTHOUGH the aluminum industry is not a large one in the sense that the iron industry is, it is growing very rapidly. The output of the United States in 1894 was 550,000 pounds, and in 1895 it was about 850,000 pounds.

Practical Information.

ADVANCE sheets of *Poor's Manual* for 1896 give the total miles of road at the close of the year as 180,955, of which 1,922 miles were constructed during the year. The share capital was $5,182,121,999, an increase of $106,492,929 or 2.1 per cent. The funded debt of all lines amounted to $5,640,942,567, an increase of $35,166,803 or .63 per cent. Other forms of indebtedness amounted to $418,505,092, an increase of $35,577,258. The total gross earnings of the roads were $1,093,139,605, an increase of $25,496,092. Net earnings were $323,196,454, an increase of $5,439,055.

The street railway lines in the country foot up 15,596 miles, an increase of 3,514 since 1891. The capitalization, representing all but 530 miles, amounts to $828,547,285 in stock and $525,949,928 in bonds.

The earnings of 17,269 miles of trunk-line roads last year were 817 millions, compared with 807 millions in 1894 and 923 millions in 1893. Net earnings were 251 millions, against 247 millions in 1894 and 279 millions in 1893. The dividends paid amounted to 1.95 per cent on the share capital invested, compared with 2.28 per cent in 1894, 2.40 per cent in 1893, 2.43 per cent in 1892, and 2.46 per cent in 1891.

The following statement shows the results of the operations of the railroads of the United States for the year 1895, compared with those for 1894:

	1895.	*1894.*	*Increase.*
Miles of railroads oper'd.	179,162.18	176,229.11	2,933.07
Tons freight moved.....	763,799,833	674,714,747	89,085,086
Freight mileage.....	88,567,770,801	82,219,900,498	6,347,870,303
Passengers carried.....	543,974,263	583,248,007	*39,273,744
Passenger mileage.....	12,642,202,551	13,600,531,635	*958,329,084
Earnings fr'm freight.....	$743,784,451	$700,477,409	$43,307,042
Earnings fr'm passenger...	261,640,598	276,031,571	*14,390,973
Miscellanco's earnings.....	87,714,543	91,134,533	*3,419,990
Total gross earnings...	$1,093,139,502	$1,067,643,513	$25,496,092
Net earnings.	323,196,454	317,757,399	5,439,055

* Decrease.

A. L. HENDERSON, in a paper lately read before the London and Provincial Photographic Association, described a series of experiments he had made in regard to the defects or deterioration of dry plates due to packing, and came to the conclusion that paper was unsafe as a receptacle for holding plates. His recommendation is that plates be separated by strips of tinfoil and stored in metal boxes, a suggestion which seems feasible in view of the facility which the X rays have of passing through paper. There appears to be a phosphorescent action from paper on the film, as well as chemical, according to the results of his experiments.

IN the Zurich industrial exposition an air tester is exhibited, which shows whether and in what degree the air in a workshop is contaminated. The apparatus consists of an air-tight closed glass vessel filled with a red fluid. Through a glass tube that dips into the liquid, and is bent at the top, a drop falls every hundred seconds on a cord that hangs beneath and that is somewhat stretched by a weight. The fluid from which the drop comes has the property of changing its red color to white by the action of carbonic acid. The more carbonic acid there is in the air the quicker this change in color takes place. If the air is very foul the drop becomes white at the upper end of the cord, while the change of color corresponding to a slight proportion of carbonic acid does not take place till the drop has run farther along the cord. The exact condition of the air can be ascertained by observing a scale that is placed alongside the cord.

IN the Edinburgh Hospital Reports Dr. John Thomson publishes a study of the morbid habit of dirt eating in various parts of the world. It is his belief that the dirt has a well-defined hygienic value, and is eaten by children for medical purposes. The physical ailing which brings on the appetite for dirt is in most cases anæmia, which simply means a running down of the system. In these cases the habit might be formed from an instinctive craving for earthy salts, such as iron and lime, just as a cat or a dog, when needing a little physic, will eat a blade or so of grass. The eating of substances of various kinds which are not only indigestible, but are also devoid of any natural attractiveness of taste, is a morbid habit which has often been observed both in human beings and among certain of the lower animals.

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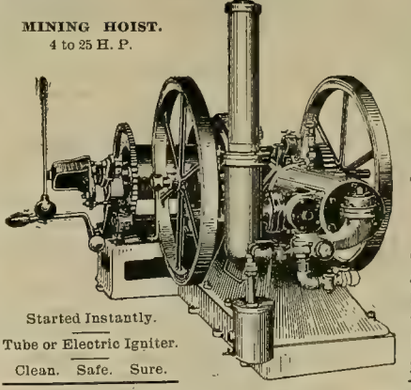
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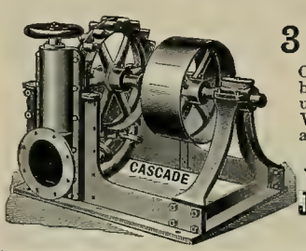

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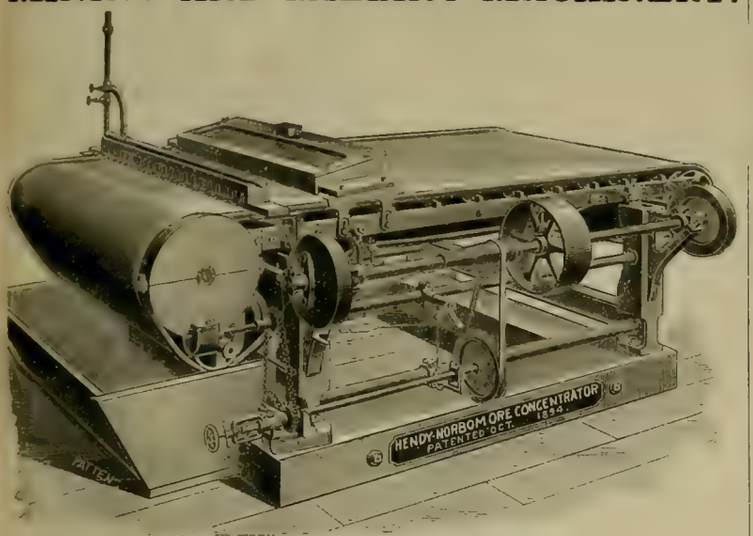

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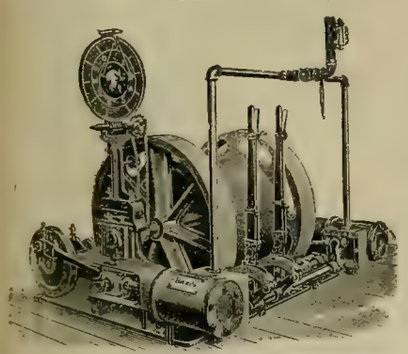

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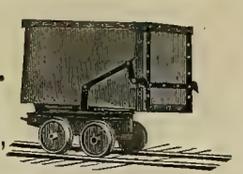

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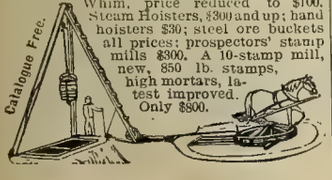

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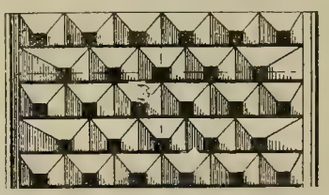

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MERCUR.

UTAH'S NEW EL DORADO.

Wonderful Development of the Camp Floyd Mining District.

The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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Mining Summary.

CALIFORNIA.

Amador.

At the Gwin mine the ledge at the 1300-foot level is 20 feet wide, as developed by the crosscut. The ore shoot in the old workings was 1100 feet long, and the new workings show an increase to 1300 feet, making it one of the largest ore bodies in California. The rock is expected to average $8 a ton.

At the South Paloma the vein is looking well. The fissure is 5 feet wide and nearly filled with rock of a similar character to that in the Gwin.

Ledger: W. and H. Dennis are putting a mill on the American mine, near the Treadwell property.

The two-compartment shaft on the Pocahontas mine has been commenced and will be pushed rapidly.

Dispatch: Work at the Amador Queen No. 2 mine has been temporarily suspended.

Work of putting in a station and crosscutting is now in progress at the Anita.

One thousand feet is the objective point of the management of the Alma mine. After that depth is reached the work of crosscutting and opening up of the property will begin.

Republican: The Del Ray mine has made arrangements with the Amador Queen No. 1 mine to mill fifty tons of ore as a sample test of their ore. If these tests prove satisfactory, they will shut down and put up a hoist and will erect a mill of fifteen stamps.

The Argonaut Mining Company has just completed a station at the 1250 level and intends cutting another station at the 1350 level soon.

Calaveras.

Mountain Echo: The water is being taken out of the Pure Quill mine preparatory to prospecting for the vein.

The Specimen mine at Fourth Crossing is prospecting well, and a vein of milling ore 14 feet in width has been discovered.

Chronicle: At the Hartmann mine the new hoist and mill is nearly ready for operation. The shaft is down to bedrock, a depth of 55 feet.

Angels *Voice*: A. N. Butts has given up his bond on the Chaparral Hill property, as the time allowance, ninety days, was insufficient to prospect the property. It is now under consideration by a French syndicate, represented by M. Chambry of Paris. The company is extensively interested at Crown Point and other places.

Prospect: At the Santa Ana and Missouri mines, which are operated by Col. Woodrow, it is reported that very good rock has been found.

Citizen: The ledge recently encountered in the 1350-foot level of the Argonaut is from 12 to 13 feet wide and is rated from $6 to $10 per ton.

The Lewis gravel mine at Vallecito has been sold for $9000. This mine will be operated as soon as the season for hydraulic mining opens.

The owners of the Barnhardt gravel mine at Old Gulch have received the necessary instructions from the Debris Commissioners for the construction of the restraining dam to be built upon the site recently selected by Captain Gillette. Work will be immediately begun.

At the Esmeralda mine some time has been spent in cleaning out the old shaft. This work is about completed and the new management will soon be able to decide upon the plans for development.

Del Norte.

Miner: Work will be resumed at the Coon mountain mines. A representative of the company from Chicago is at the property. All the men that can be obtained hereabouts will be given employment until the ditch is completed.

El Dorado.

(Special Correspondence).—The Two Channel Mining Company, eight miles above Georgetown, has thirty-five men at work. This is a gravel property. Both hydraulic and mill are the modus operandi.

The Josephine mine, an old property near Volcanoville, is being opened by Jacob McCaul. This is a quartz property.

The Landecker, an old-time gravel property of merit four miles south of Placerville, is being reopened on an extensive scale.

At the Gold Note and Philadelphia properties, twenty-five miles east of town, the shaft has reached 215 feet. It is double compartment. At 350 feet it is proposed to run the levels south to the three ore chutes already in the upper tunnels. The ore encountered is high grade and the vein 6 feet. The new steam hoist has a capacity of 1000 feet. A sawmill has been recently completed and is in operation. This is operated by the Septimus Development Company. R. S. Raw is superintendent.

The execution of a bond for two years by Melton & Parlow to Thomas T. Lane of the properties comprising fourteen claims known as the Gentle Annie group is of record. Mr. Lane is preparing to begin active work sinking two new shafts, double compartment, to considerable depth. Mr. E. A. Davis will be placed in charge under Mr. Lane's management. The consideration is $375,000.

It is currently reported that the erection here of an electric power plant within the near future is a certainty. It is reliably stated that the power will be first introduced in one of the mines south of town. The people engaged in the enterprise are men of means.

The tunnel on the Rosebud, twenty miles southeast of Placerville, has reached 120 feet on an 8-foot ledge.

Placerville, September 14, '96.

Kern.

Pick and Pan: The new stamp mill at Garlock has started up. This makes four stamp mills in operation on ore from Randsburg and vicinity. One is situated at Koehn springs, one at Mesquit springs and two at Garlock.

It is reported that the Rameys are closing a deal for the Butte mine with a syndicate of capitalists for $115,000.

Mariposa.

(Special Correspondence).—The rapidly increasing development of Mariposa mines has led to the organization of a company to utilize the waters of the Merced river for the generation of electric power in the Mariposa Electric Power Company, recently incorporated with a capital of $1,000,000. The moving spirit is Captain A. H. Ward, of the Penon Blanco mine. The point on the Merced river in Mariposa county that has been selected for the location of the work is at the Broadhead old dam, about eight miles above Benton Mills, where the new bridge on the road between Bear Valley and Coulterville was erected last year. It is proposed to locate the power plant at the Benton mills and bring the water from Broadhead dam by ditch and flume, a distance of about eight miles, the ditch to be 20 feet wide by from 7 to 8 feet deep. The proposed dam is to be constructed of stone and Portland cement, and to be 85 feet high. The fall at the power-house would be 225 in the clear and the estimated water supply not less than 1000 miners' inches at the driest season, with an unlimited quantity to draw upon while the snow waters are running off from the Summit range. When the river is at its lowest there would be an available supply of not less than 6000 horse power for sale to mine owners in the district.

At the present time the cost of steam power is from $12 to $15 per horse power a month, and as the supply of timber for fuel is each year becoming scarcer, the cost is likely to increase. The company proposes to sell power at from $5 to $6 per horse power per month, cutting the present cost by more than one-half. In addition there would be considerable saving in lighting and in other ways, and consumers in using the electric power would save the cost of firemens' wages, stocks of fuel, boilers, etc.

J. A. Coram, Palmer and other shareholders of the Merced Gold Mining Company are visiting the mines at Coulterville with a view to deciding on future operations. The mill at the Potosi is for the present shut down. Sinking is being continued in the various shafts.

A. G. Briggs, the superintendent of the Tendron mine at Whitlocks, has severed his connection with the Sierra Buttes Company, Ltd. His successor has not yet been appointed.

Augus Mackintosh, who recently bought the Hayseed and Triumph mines at Whitlocks from the Helms, is placing new machinery on the ground. The property will shortly be incorporated and worked on an extended scale.

In Hunter's valley there is more activity in mining matters than there has been for years past. Captain Goodall, of Goodall, Perkins & Co., has begun work on the Barretta mines, which he has bonded for a year. Extensive machinery for prospecting work is being put in position and a considerable number of men will be employed.

J. F. Clapp, the Chicago mining engineer, who acts as consulting engineer for the Selick mine at Haywards, is so satisfied with developments that he has just placed orders in San Francisco for an extensive mining plant.

The Louisiana mine, A. C. Cable superintendent, is now working full blast. Machinery has been in place for some time past, and 30 men are employed in sinking and development work.

B. S. Hill, of the Kohler group of mines, has ordered a complete hoisting and pumping plant for erection at the Coward shaft.

Coulterville, Sept. 15, '96.

Gazette: Goodall, Perkins & Co., who have bonded the Bareta mine in Hunter's valley, are beginning work. Several loads of machinery have arrived in Hunter's valley for the new mines and the work of getting ready for a thorough development of the property is going on.

D. Castagnetto has bonded his ranch to mining men.

Joseph Barrett has bonded his mine in the valley and work on the property will be begun in the near future.

Miner: B. S. Hill, of the Kohler group, is having constructed in San Francisco, a fifty-horse power boiler and a hoisting engine of thirty-horse power for the Coward shaft.

J. J. Casey, of the Riverside mine, on the north side of the Merced river, is taking out some rich ore.

Nevada.

Telegraph: The stopes and drifts of the Gold Hill mine are now above water and in a few days the bottom of the shaft will be reached. The new machinery works well and the new compressed air pumps handle the water easily. Work was commenced Monday morning in the second level north and south and as soon as the water is out new levels will be started. No stoping will be done for the present but the mine will be thoroughly prospected in the lower portions.

Tidings: Dr. A. McMahon of San Jose, and his son, A. McMahon, Jr., are negotiating for the purchase of a 10-stamp mill for the Live Oak and Minuett which has been fully developed. There is upwards of 3000 tons of ore on the dump. The principal ledge is about 5 feet thick, and is said to average $10 per ton.

Placer.

Wm. Rablin is opening a tunnel in the Nary Red district near Colfax to prospect for drift diggings.

Plumas.

National-Bulletin: J. H. Maxwell, Mr. Batchelder and some San Jose people have located two miles of what is supposed to be an extension of the Elizabethtown channel extending from the Vidette claim northwesterly to Hardsock Hill, on the east branch of Feather river. At one point a prospect shaft has been sunk and gravel reached, but water also has been encountered, which probably will make pumping machinery necessary.

Independent: Work on the Verdi placer claim on Mill creek, owned by D. M. Bull, Judge Hayden and John Sparks of Reno, has been temporarily suspended, the old pump having refused duty. Another has been secured and is being put in position. The shaft is down nearly 60 feet.

Santa Barbara

A dispatch says: "The mining notices, for which there has been such a demand, prove to be for use in the San Rafael mountains, about nine miles from Los Olivos, where Peter Montenero has discovered a 16-foot ledge of gold-bearing quartz. People are rushing in to file claims, and 160 acres of land is already covered."

Shasta.

Free Press: A three-foot vein of quartz has been struck in the prospect tunnel on the claim of W. K. Scott and B. Golinsky, who have been searching for an extension of the Uncle Sam mine.

Courier: Captain Taylor and others who own mines at Lower Springs are engaged in systematic work developing quartz mines in that neighborhood.

Murray Brothers, of Redding, are pushing work on the Hull-Murray-Conroy mine, north of town and are now in 200 feet and will run that distance on the ledge both ways.

Searchlight: The National Consolidated Mining Company, operating in the Churntown district, is now putting up a 10-stamp mill, the machinery having been hauled out last week. The mine employs twenty-four men, and when the mill is completed the force will be increased.

Sierra.

Mountain Messenger: Mr. Mead has developed a quartz mine on the county line between Plumas and Sierra, near Mills peak. The ledge is 4 feet wide and prospects well.

At Forest City the South Fork mine tunnel is now in 2300 feet, with gravel above it. The rock is soft at the face. A large dump is about completed to hold some 2000 carloads of gravel. The company expects to put in a small steam engine to haul the gravel cars out of the mine.

The Maple Grove Company will soon begin work running their tunnel. This company is composed of Downieville and Forest business men, principally.

It is reported that the Ruby mine will soon resume operations. It has been one of the dividend mines in Sierra county in years past.

A company of surveyors have been at work on the Black Jack mine, near American Hill, which will soon put on a force of men.

The North Fork Company is still pushing ahead their main tunnel, which is in 2700 feet, with about 150 feet yet to run to pay dirt.

At the Garnett, formerly the North American and Bunker Hill properties, there are at present employed about sixty men. A large part of this force is at work on the outside preparing for the winter. These men are engaged cutting logs for an impounding dam, digging ditches, laying pipe for the hydraulic works and cutting timbers for underground work.

George Warder has lately erected a 2-stamp mill for prospecting at the Crowley mine on the south fork of Scott river. The ledge is very large, but the ore is of a low grade.

Siskiyou.

Journal: Most of the hydraulic mines along Klamath river have been closed down, as their supply of water has given out.

Bailey & Carrick have twelve tons of ore at Lamb's mill from the Katie May mine. The last rock they had crushed was selected rock and went $87 to the ton. They expect this will go full $40 or $50 a ton.

The Nebraska mill on Cherry creek, closed down this week after having crushed about fifty tons of ore. The mill will no doubt be started up again in a few days.

The Horse Creek Mining Company have just made a cleanup, with satisfactory returns to the owners. The gold is coarse, one piece weighing $61.

The Distlehorst & Barton Dredger Company will commence operations at Buckeye bar soon, at a point where good pay has been found by the wing-dam process. The dredger itself has proven a success, as far as its workings are concerned.

Chris Everson has found an excellent prospect on the old Yankee Point channel, just below Oak bar. He believes he has found the old rich channel lost at Yankee Point years ago.

The Culver Mining Company, at the mouth of Barkhouse creek, have resumed their mining operations at that point. With their new pump they will strike bedrock in a short time.

The Edwards Mining Company, on Horse creek, are laying the foundations for an 85-foot dam and sawmill site. It is their intention to work the creek by the elevating process.

Tuolumne.

Union-Democrat: Work has been resumed on the Punter.

The long tunnel being driven along the vein on the Eagle tapped the shaft unexpectedly Monday, and caused a temporary suspension of operations on the Eagle end. The shaft is filled with 600 feet of water.

F. L. Fisher and associates will put up a small hoisting plant on the Never Sweat mine near Groveland for the purpose of prospecting.

The Arbona tunnel will soon tap the ledge.

The Mazeppa has shut down temporarily. It is under bond from W. N. Harris.

Preparations are being made to open up the Alabama mine upon a large scale to Lord Sudley and the other English shareholders, who, when here, were well pleased with the property, which they have bonded.

The company operating the Maccaroni mine under bond near Groveland have just had delivered 30,000 feet of lumber for the new 10-stamp mill and hoist being erected on the claim.

The Argall Bros., who are operating the Slap Jack mine in connection with a San Jose company, tapped a rich chute of ore lately. It is proposed to put in an engine and hoisting plant soon.

Independent: The Confidence mine is contemplating the erection of a 30-stamp mill.

The Rawhide mine will shortly add 60 stamps to its present mill capacity.

Another pocket has been taken out of the Birney & Hudson mine, at Brown's Flat, and yielded $1250.

In the Arbona mine, owned by Stockton parties, last week a large vein was opened up.

The Mountain Lily and Mountain Boy mines, northeast of Columbia, and owned by J. W. Armstrong, have been sold to A. S. Graham of this county and Jacob Schoenfeld and David Adler of San Francisco. These mines are new properties, being discovered less than two years ago.

Trinity.

Journal: Donohue & Co. have struck it rich in the Jim Kelly mine on Donnelly gulch in Deadwood mining district. The ledge at the top of the drift is 2 feet wide and 3 feet wide at the bottom.

The Bonanza quartz mine, near Trinity Center, owned by William Vollmers, Elias Ellery and others, has been bonded to McCloud & Johnson for, it is said, $100,000.

The Copper Queen mine, in the same district, has been bonded by F. L. Dimock, T. J. Baker and Gerald O'Shay to D. B. Hunt of Redding for $10,000. Work will commence at once in sinking a shaft and driving a tunnel.

M. Bretton, a prominent mining man at Minersville, has gone to France for the purpose of interesting French capital in the development of mines in that section.

NEVADA.

Dayton *Times*: There are now in the neighborhood of thirty men working on the Ninety-Four Company's placer ground on the flat at the mouth of Gold canyon. Eight or nine of these are the owners of the ground, and the others are working on leases of portions of the ground, and all are making fair wages. Some very good ground has been found by the company recently, and those working on it are making from $3 to $3.50 per day. The others are making all the way from $1 50 to $3 per day per man. When it is understood that the manner of working this ground is very crude; that the dirt is hoisted from drifts in buckets by man-and-horse power, and washed in the boxes the same as forty years ago, it will be seen that the property is quite a valuable one, which, if it could be operated on a large scale, would no doubt be the best paying piece of property in the county. Efforts have been made and are still being made to bring the attention of capitalists to this property, and it is hoped they will meet with success. There is a vast amount of ground, and it would take years to work it out, even with the most advanced scientific methods of handling it.

At Pioche the Old Timer, which is owned by W. V. Rice of Park City and others, is now affording employment for twenty men. The leaching plant has been overhauled and repaired and is now in good order.

The Yuba is being worked under lease and is making periodical shipments of high-grade ore.

Frank Swindler is working a small force on the Poorman, in which large amounts of low-grade ore were left standing at a time when it was only possible, with the great cost of transportation, to handle the high grades at a small margin.

The Eureka Hill Company has its new well at Homansville down through the wash 260 feet, and struck a large flow of water on bedrock, sufficient for all present milling purposes. They will now start up their full 100-stamp battery which has in part been hung up during the past month for want of water.

A strike of more than usual importance was made in the face of the 1000-foot level of the Gemini lately. This ore body is in virgin ground and demonstrates that the rich ore above, which has made that property famous, continues.

The Centennial Eureka has purchased a water right and mill site near the Warm Springs, between Santaquin and Goshen, and the company has under consideration the erection of a mill plant at that point.

White Pine *News*: A new strike has been made in the Sacramento Pass mine, east of Osceola. Work was begun in the shaft, which was abandoned several weeks ago, the outlook not having been at that time considered favorable; and within four feet of where the work was discontinued a large body of good pay ore was encountered. Several good pay streaks have also been uncovered in the placer diggings.

Eureka *Sentinel*: The Keystone Mining Company has been formed for the purpose of developing gold and silver mines in Roberts creek district, in the west side of the county. The principal mines owned by the company are the Keystone and Odair. An encouraging strike was made in the former recently. They have purchased the reduction works at the old town of Sherwood, or Union, and are arranging to have the engine, furnace, buildings, etc., removed to the neighborhood of their mines.

OREGON.

Democratic Times: In the lower tunnel of Dr. Hinkle's quartz ledge on Sardine creek a vein has been struck showing a width of 2 feet of good ore.

A. W. Sturgis of Forest creek has sold his property to Portland parties. The price paid is $40,000.

Major Newell is preparing to put a 120 H. P. engine at his mine on Rogue river, near Grant's Pass.

The Steamboat mine has been bonded by Captain Nash and W. I. Vawter of Medford,

Charles W. Knowles of Portland and A. M. Crawford of Roseburg, who will endeavor to discover the lost quartz ledge and also the placer channels, which were rich in early days.

Grant's Pass *Observer*: The Gold Basin Company has given up the idea of getting water on their property and are packing the machinery back to Kerby. A large amount of capital was sunk in the venture.

The merchants of Grant's Pass buy from $500 to $800 worth of gold dust per day. The large cleanups are shipped direct to the mint and no record is kept of them.

Bedrock Immortal: At Granite are the La Bellevue mine, with 800 feet of development work; the Red Boy, a steady producer; the Surprise and Ornament mines, with a 3-foot vein of gray copper ore that will go $500 to the ton; the Ibex, with rich ore ready for shipment valued at $50,000 and a 3-foot vein in the face of the tunnel that will go $200 to the ton, and many other properties.

The Salt Lake syndicate owns about twenty miles of placer ground on the north fork of the John Day river, and with the building of large ditches and reservoirs and the operations of the mines employs 100 men, and will continue to do so until winter sets in.

BRITISH COLUMBIA.

Slocan Mining Review: The directors of the Morning Star Company have decided to install first class machinery and pumps at the mine at once and push development work to the 300-foot level.

In Long Camp, T. Shonquest has purchased a half interest in the Denaro Grande for $10,000.

A report comes from Seattle that C. F. Fishback, one of the owners of the Seattle *Times*, has sold to the British Northwest Gold Mining Company property in the Cariboo district for $500,000. The properties are: The Maude Hydraulic Mining Company, 880 acres; Fishback Hydraulic Gold Mining Company, 570 acres; Quesnelle River Gold Mining Syndicate, 20 miles of the main Quesnelle river. It is said the men making the purchase represent J. E. Addicks and E. F. J. Gaynor of New York.

Spokane *Chronicle*: The Columbia and Western Railway Company, operating between Trail and Rossland, is building handsome general offices near the smelter at Trail. As soon as the building is finished, the head office will be removed from Rossland and the road will be operated from Trail. It is not likely that the road will be continued west of Rossland this year.

A syndicate of Eastern capitalists is negotiating for the Iron Horse at a price said to be $150,000. This is the property A. E. Humphreys purchased less than a year ago for $25,000.

The Olive Mining Company, which was capitalized at $20,000,000 for the purpose of working the Volcanic group of claims in the Boundary country, has commenced work on the quarters for the men, which are being built to accommodate 100. It is the intention of the company to keep 40 men steadily at work during the winter.

The Delacola Gold Mining Company has been organized at Rossland under the laws of British Columbia, for the purpose of developing the Delacola, on Monte Cristo mountain.

New Denver *Ledge*: Dr. B. Irving, of Vancouver, has bonded the Neepawa, Baker Fraction and Argenta, on Ten Mile creek, for $48,000.

W. A. Johnston and W. C. Fry of Quesnelle have bought for themselves and Chicago men the Chinese hydraulic claim on Cunningham creek for $16,000, $1000 down.

The Olive Mining Company, organized in Spokane with a capital of $20,000,000, is developing its Volcanic property on Kettle river. There are five claims in the Volcanic group, but the chief showing is on the Volcanic. The whole side of a mountain slipped off in some past age and, it is said, left exposed a body of gold, silver and copper ore 600 feet wide and 3000 feet long. The company has driven one tunnel 340 feet to tap the ore body 1100 feet below the apex and have sunk many shafts to test the ore. Streaks of native copper have been discovered, and the value of the entire mass has been found to be high enough in gold, silver and copper to permit of smelting. Development work will be continued fall and winter, and in the spring a 500-ton matting plant will be erected. It is estimated the average of copper will be 9 per cent.

The following are returns of shipments of bullion, matte and ore from the mines and smelters in southern Kootenay for the week ending September 5th:

BULLION AND MATTE.	Pounds.	Customs Value.
Hall mines smelter, Nelson, matte	78,900	$9,171
Trail smelter	40,305	.....

ORE.	Tons.	Approximate Value.
Slocan Star mine, Sandon	160	$11,511
Idaho mine, Slocan	40	3,000
Alamo mine, Slocan	20	1,500
Wonderful mine	65	5,049
Ruth	65	2,660
Washington mine, Slocan	66	4,818
Goodenough mine, Slocan	12	3,721
Surprise mine, Slocan	17	2,111
R. E. Lee mine, Slocan	14½	1,683
Mile Point mine, Ainsworth	15	1,083
No. 1, Ainsworth	15	2,418
Highlander mine, Ainsworth	13	707
Le Roi mine, Rossland	163	7,550
War Eagle mine, Rossland	23	1,090
Josie, Rossland	20	886
Poorman mine, Ainsworth	17½	830
Total for week	786	$63,596
Total so far for 1896	19,723½	$2,196,723

UTAH.

Salt Lake *Tribune*: Commenting upon the advance in smelting charges at the Germania smelter, Manager Jones says that it had been rendered absolutely necessary as the plant had been sustaining a steady loss and in some instances realized but 50 cents on a ton of ore. The Colorado smelters, he explained, had also been compelled to advance their charges or shut up shop, and while he regretted that such steps were necessary in times like these, it was either that or blow out.

A rich strike has been made in the Watunka group on a fork of Cottonwood canyon of 3½ feet of ore that assays 340 ounces in silver and $14 in gold.

At the Mercur mine the output has reached 240 tons a day, and a better percentage of values is being saved than ever before.

At Tintic, the new hoisting works at the South Swansea are about completed and a new ore house is being built. A strike has been made in the south drift on the 350-foot level, there being a 2-foot vein of solid ore running 67 per cent lead, 114 ounces silver and $4 gold.

Operations at the West Cable were discontinued last week by order of the board of directors. The indications are that the property will be closed down until after the election.

At the North Eureka the drift in the bottom of the shaft is in quartz which runs nearly enough to be pay ore, and its quality is steadily improving.

Shipments for the week were divided as follows: From the Bullion-Beck mine, 30 carloads ore, Bullion Beck mill, 10 carloads concentrates; Centennial Eureka, 8 carloads ore; Ajax, 10 carloads ore, Utah, 5 carloads ore, Sioux mill, 6 carloads concentrates; Four Aces, 1 carload ore; Northern Spy, 5 carloads ore, Dragon Iron mine, 2 carloads ore daily.

George W. Keel has made the first payment and secured possession of the Antelope group of mines at Bingham for Eastern capitalists.

Several placer propositions near Bingham that in days gone by have paid well are being revived, with good prospects.

The Northern Chief is making a 100 ton shipment of ore carrying high in lead and gold—an unusual combination. The chief is yielding some of the best grade that has been produced in the district this season, because of its gold value.

Arrangements are being made for a mill at the Northern Light mine, at Mercur, of 200 tons capacity, although for the present tanks for only fifty tons will be put in. They will continue development work, and as more workings are opened, the number of tanks will be increased.

IDAHO.

The various mining camps around Lake Pend d'Oreille are showing considerable activity.

At Kendrick the placer miners are coming in from the Swamp Creek district, east of there, and bring some fine gold. While this is a new district, the cleanups show rich ground.

MONTANA.

The failure of the First National bank in Helena on Friday will cause the closing down of four mines and one concentrator at Rimini. The mines are the Lee Mountain, Lady Meagher, Lady Washington, Maccauber and Morrison. The mill is the Lee Mountain. All are leased by A. M. Esler and are gold and silver producing properties. Mr. Esler had his money in the bank. He ordered his superintendent to suspend all operations, which will throw out of employment not less than 50 men. The Lee Mountain mine is one of the oldest mines in the State, and at one time was one of the richest.

At Libby the Chicago-Montana Mining Company are driving a 200 foot tunnel on the face of their old one and running a new 150-foot tunnel at the air shaft, are putting a 70-horse power engine and boiler, and building a new office and bunk house. The company employs about 150 men, and ships between 20 and 30 tons of concentrates per day.

WYOMING.

At South Pass, during the past winter, experiments were made with the cyanide process, says an exchange, with the result that when spring opened F. B. Sheldon started a plant below South Pass and worked a dump of tailings, cleaning up something like $14 per ton. The summer's run netted him about $1500 clear; Bryson and Dunphy put four tanks in above Atlantic City, and are working tailings which ran to waste; Huff of Atlantic City purchased the tanks belonging to Sheldon and has them working on a large dump of tailings in Atlantic. J. J. Martin has purchased the tailings at the Carisso mill from Samuel Leckir, and is putting in a cyanide plant. There have been millions of dollars let run to waste during the past twenty-nine years, because there was no method known to science to save the gold.

SOUTH DAKOTA.

Black Hills *Times*: At Galena one hundred men are employed by the Union Hill Company, the largest force being at the Colletta, where a double force of twenty men are engaged. Silver preponderates at the mine, but a good showing of both gold and lead is made. It can no longer be doubted that the future of Galena is assured, and that besides large bodies of silver ore there is also an abundance of good paying pyritic gold ore.

The National shaft on Sugar Loaf mountain is down 190 feet and still in blue trachyte. The contractors receive $12 per foot for sinking, the owners furnishing timbers and power for hoisting and other purposes.

Bids for sinking the Dacey shaft at Ragged Top 100 feet ranged from $8 to $26 per foot. The variation was so great that all were declined. The owners of the property have decided to procure a diamond drill and prospect the lower levels with it.

COLORADO.

Denver *Republican*: The management of the Mollie Gibson has issued a report to the stockholders covering the work of the past 18 months. In a letter from the president of the company accompanying the report, he says that there is a treasury balance of $91,000, speaks of the ore bodies which were cut off in the neighborhood of the sixth level by a complicated system of faulting. The development of the lower levels has not yielded a large amount of ore, and up to the present time the continuation of the main ore body, which produced so much rich ore above the sixth level, has not been found. Irregular and sometimes large bodies of ore have been encountered in the various fault planes, and all indications point to the fact that the main body has been carried down by the faulting to a depth greater than has yet been attained in the workings of the mine. The developments of the last few months in the tenth and eleventh levels north have been encouraging, and it is believed that the main ore body will be found not far from the shaft, just below the twelfth and thirteenth levels. The report shows that during the 18 months the mine shipped 6277 tons of ore which returned 593,310 ounces in silver and 341,356 pounds of lead, the total value of which was $382,492. The average value of the ore per ton in silver was $59.95 and lead 36 cents. Construction and operating expenses footed up $261,765; net cash returns, $293,647; net profit at mine, $31,882.

The report received last week in regard to a rich strike of ore near Silverton turns out to be correct. The find, instead of being on Kendall mountain, was at the head of Whitehead gulch, about five miles from Silverton. The gulch has all been staked off since the find, and many of the claims show up rich in quartz. A shipment will be made from the property soon.

Rasmus Hansen's Mastodon mine is now shipping 25 tons of ore daily, taken from an open cut on the surface. The vein is about 12 feet wide.

In the Esmerelda in Minnie gulch the tunnel has been advanced 80 feet, the pay streak averaging 12 inches in width for the entire distance.

In the Last Hope mine in Ice Lake basin the drift is in 200 feet, and 50 feet from the mouth a winze has been sunk 40 feet. The ore body averages from 6 to 8 feet through and runs from $25 to $30 per ton. Thirty tons are taken out daily.

The Little B and Adams lodes on Sampson are to be worked by a company which has recently been organized in Quincy, Ill. Buildings are to be erected at once, the lumber being now on the ground, and mining operations will continue all winter.

At Cripple Creek the Gold Coin Company is preparing to take up the bonds on the property on Sept. 25, and if it succeeds, a dividend by the St. Rosa company to cover at least half of the $65,000 received by the Gold Coin is expected. Production last month was about $12,500 gross, the mine doing much dead work in the meantime. In September it is expected to have double that amount.

The strike in the May Belle tunnel on the Lawrence townsite is proving to be a great one. The ore has widened out to fully 8 feet and fully 18 inches of it carries sylvanite.

Grant & Hammond are getting into a larger body of ore in their shaft on the north end of the Cariolanus, on Battle, the seam now showing from 16 to 24 inches in width.

The Ironclad is now producing more ore than ever and the grade is much higher.

During August the Elkton produced ore which yielded above freight and smelting charges $44,000. The payroll amounted to $8000, leaving the company $36,000 profit for the month. After the regular dividend of $10,000 is paid the company adds the remainder to the reserve fund, which now aggregates about $83,000. At this rate the mine is promising to pay a dividend of four cents but until the reserve fund has reached $100,000 the company will adhere to its 1 cent a month dividend. In all probability October will see the dividend increased to 2 cents.

Cripple Creek *Mail*: The Independence is now loading five cars of ore daily at Victor of quartz that goes to the smelter and which is understood to be high-grade ore.

The Old Gold Geyser mill on Cripple Creek, south of town, has been started up by the new Geyer Gold Company recently formed in Chicago by Riley & Feree. Thirty tons of ore from the Elkton dump are being treated daily by stamp and plate amalgamation, regrinding and concentration after the California blanket method. The clean-ups have shown a saving of 85 per cent and the company is preparing to handle a higher grade ore than that used in making the preliminary test.

The new machinery on the Legal Tender is nearly completed and will be started soon.

The estimated deficit in the net earnings of the Isabella Company for the month of August, as placed by the company, is between $7000 and $8000. The expenses for August were $17,500.

Another strike is reported from the Christmas mine which exceeds in value anything else ever found in the mine. This time the ore was found in a winze that is being sunk to connect the 175-foot with the 235-foot level.

The Taylor Park Mining Company of Gunnison county is building a 17-mile ditch to their placer ground, of which they own nearly 4000 acres in Taylor park.

Record: The Silver Pick mine, in the Mount Wilson district, closed operations September 3rd. There were about 135 men employed in the mine and mill, and this action by the owners came quite unexpectedly. A report is current that the suspension is a temporary one, and in the course of thirty days the employes of the company will be put to work at their former places and both mine and mill placed under more extensive operations than heretofore.

The management of the Gold King mine and mill have reduced their working force from sixty to eight men.

The Milan mine on Sugar Loaf, formerly owned by Dr. J. L. Bond, has been sold to a London, England, syndicate for $100,000. The first payment has been made and it is expected that the English representatives will be in Boulder shortly to take charge of the property and start it up.

The Pine Shade mine has been started up by Silliman and Potter, the owners.

ARIZONA.

Yuma *Sentinel*: The Golden Dream Company secured the Alcyon, the Yellow Gold and the Golden Dream group of mines, fifteen in all, for $30,000. The same company has purchased the Lottie Frank group, five mines, for $10,000. The new prospecting mill ordered by this company will have a capacity of from 25 to 30 tons in 24 hours.

The Senator Dorsey Company has purchased the Dr. Jayne mines and the English Company placer mines and pumping plant.

An English company have a group of twenty-one mines in the Peacho basin, adjacent to the Goshen mine of the Jayne group, which they will open up when cool weather comes, and for the working of the ores of which they will put up a mill at the Colorado river.

Orb: The second payment on the Tucker mine, near Congress, has been made. The price agreed upon for it is $30,000.

The Arizona Copper Company of Arizona have for years been concentrating in a mill of the ordinary type certain of their siliceous carbonate ores. The product is high and so are the tailings. These they are now leaching with sulphuric acid made in ordinary kilns from their own lump pyrites. This is diluted to 17 Baume before being passed through the tailings, which are delivered to the leaching vats directly from the jigs, and are therefore free from slimes. The coarse tailings—the coarsest being ½ inch in diameter—are deposited in tanks 10x10x6. None of the ores consist of silica and oxide of copper only, and, therefore, more or less alumina, manganese and iron are dissolved, which increases the consumption of acid; but this matters the less, as the roasted pyrites from the kilns are copper bearing and serve as a valuable flux.

At Clifton the copper is precipitated by scrap iron, and the precipitation is effected in revolving barrels, immersed in the copper solvent. The staves of the barrels are made of copper rods, secured at suitable intervals in heavy copper heads, provided with trunnions. Coarse copper cloth covers the barrels. The rapidity of precipitation ensures a precipitate of extreme purity, which is run down in copper bars with the oxidized copper ores from the cupolas. In California there are near Copperopolis and at Spencerville masses of cupriferous pyrites, whose ores have been treated by heap roasting and leaching.

Phœnix *Republican*: Near The Needles, on the Colorado river, there is great activity in gold mining on the river, and in the past few months several good discoveries have been made of decomposed quartz, some of it rich.

LOWER CALIFORNIA.

Lower Californian: At the Viznaga mine the 10-stamp mill will soon be running continuously. In no other mine has there been a shaft put down over 200 feet in the camp and it seems that all that is necessary to develop the camp is more capital to go farther below the surface.

SOUTH AFRICA.

Mining Journal: The possibilities of effecting the contemplated reduction of wages among the boys employed on the mines depends so largely upon the extent to which the supply of labor can be made to exceed the requirements, that it is well to note any definite point from which an extra supply may be obtained. There is a great deal of distress in Swazieland just now, and a movement here, therefore, has been set on foot to induce a large number of boys to come from there to these fields. The addition of a few thousand extra hands thus obtained should go a very long way towards rendering the scheme of reduction of wages practicable, and it is to be hoped that every advantage will be taken of this position, both in the interests of the mines and of the Swazielanders themselves.

By about the end of the year 1897 at least 1500 new stamps will be ready to drop. Most of them are now under order. It is a matter of experience that the average number of Kaffirs required on a mine in full working order can be very closely reckoned on the basis of 15 boys per stamp. Some mines can shift with 13 and 14—others make use of 16 and 17; but 15 is a fair average number. Taking these figures, therefore, it will be found that by the date mentioned no less than 22,500 additional boys will be wanted. An addition or influx of 22,500 to the native population of the Witwatersrand is no inconsiderable proportion. In 1890 there were 14,000 natives employed on these fields. By the end of 1894 this number had risen to 40,888, and the census returns published last week, as analyzed in the *Mining Journal*, indicate an approximate estimate of 75,000 natives for the whole Rand. Thus the conclusion is arrived at that by the end of 1897 the native population will be considerably over 100,000.

The difference between employing 100,000 natives at £3 per month, or under the suggested revision of wages, at an approximate rate of £2 per month, works out at the enormous figure £1,200,000 per annum. This sum can be and should be saved to the shareholders.

It is impossible to predict what the total capital of the companies, working at the particular date referred to, may amount to, but it is fair to conjecture that the saving to shareholders which could be effected would go far towards paying a handsome dividend thereon. If the other reforms already referred to were also to be carried out, it is not too much to say that this saving might easily be doubled.

It would be too much to expect that these benefits should be showered upon the industry all at once, but as even a rock is worn away by the constant dripping of water, so by continual reiteration of the difficulties under which profitable mining, or mining of any sort in fact, is at present conducted, there may be eventual, if only partial relief.

There can, unfortunately, be no doubt that among the natives at present at work there is a feeling of unrest, and that rumors have been circulated which have had a distinctly disquieting effect. It is impossible to trace the origin of these rumors, but that they are acting detrimentally there can be no doubt.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPT. 8, 1896.

567,531.—LAMP HOLDER—W. S. Arnold S. F.
567,442.—SOLDERING MACHINE—Ashley & McDermott. Brookfield, Wash.
567,372.—ALMOND HULLER—J. E. Beach, Routier, Cal.
567,289.—MOLDBOARD FASTENER—W. H. Bodenhamer, Hueneme, Cal.
567,335.—SEED PLANTER—G. W. Doane, Riverside, Cal.
567,464.—BRICK CARRIER—Fulton & Petersen, San Jose, Cal.
567,384.—SEALING METAL BOXES—Gersant & Butifant, London, Eng.
567,386.—DRIER—Hall & Casper, Sacramento, Cal.
567,388.—CAR FENDER—P. Hennessy, S. F.
567,140.—CLEANING ROLLER—W. H. Hooper, Angels, Cal.
567,543.—TRAPEZE—G. J. Kinemann, S. F.
567,244.—HARNESS—C. H. Kooper, Paradise Valley, Nev.
567,397.—TIRE TIGHTENER—G. A. Krohn, Gold Gulch, Cal.
567,349.—TYPE WRITER—A. Matteson, Portland, Or.
567,405.—WRENCH—R McDonald, Magalia, Cal.
567,493.—FARRIER'S KNIFE—F. M. McCartea, San Juan, Cal.
567,403.—BOOK TRIMMER—D. Moon, Walla Walla, Wash.
567,253.—VAPORIZER—J. Pratt, Monrovia, Cal.
567,553.—FIRE ESCAPE—E. Riley, Spokane, Wash.
567,421.—CLASP—Thomson & Drever, S. F.
567,522.—CHEESE MAKING—W. M. Turner, Woodland, Cal.
567,430.—BICYCLE FRAME—S. M. Williams, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BICYCLE FRAME.—Sylvester M. Williams, San Francisco. No. 567,430. Dated September 8, 1896. The object of this construction of frame is to avoid by its elasticity the jars and shocks attendant upon the use of a rigid frame. The frame is composed of spring or elastic bars, bent or returned upon themselves, having connections at their extremities with the stem of the front wheel fork, connections at their rear lower portions with the axle of the rear wheel, a saddle post bar extending from the upper member of the bent frame to the lower member thereof, and transverse journals on the upper and lower members of the frame to which said bar is connected, whereby the frame is permitted to freely yield.

COMBINED ALMOND HULLER AND SEPARATOR.—James E. Beach, Routier Station, Cal. No. 567,372. Dated Sept. 8, 1896. This invention relates to an apparatus for cleaning, hulling and separating almonds. It consists of a frame, a feed hopper supported thereon, a cleaning cylinder having the periphery formed of spirally coiled wires with interstices for the escape of the dirt, a hulling device, consisting of a stationary and a rotary cone adjustable with relation with each other to increase or diminish the space between them, said cones having an elastic peripheral screen coverings between which the almonds are caused to pass from end to end, an opening at the upper end thereof into which the almonds are delivered from the cleaning cylinder, a separating cylinder formed in sections having the peripheral surface of plain and corrugated wires wound about it and connecting belts and pulleys whereby motion may be imparted to rotate the cylinders.

TIRE TIGHTENER.—Gustav A. Krohn, Gold Gulch, Cal. Assignor of one-fourth to Charles Melvin and Duncan McLellan, same place. No. 567,397. Dated Sept. 8, 1896. This invention relates to a device for tightening the iron tires upon wooden and other wheels when they become slack or loose without changing or disturbing the other parts of the wheel itself, so as to either loosen the spokes in the fellies or change the dish of the wheels, or otherwise affect it. It consists essentially in having the separated ends of the felly with the upper faces recessed, perforated metal plates fitting against the felly ends, a right and left threaded screw with reduced ends forming channels which are turnable in the perforations of the plates, and shoulders which abut against the plates forming a rigid connection to prevent the approach of the felly ends, a tire having separated ends, with a groove formed in one of the ends, and a corresponding tongue fitted therein from the other, depending plates secured to the tire and enclosing the sides only of the felly ends and movable with the tire, plates secured to the under side of the tire ends adapted to fit the recessed portion of the felly sections with nuts through which the screw passes, and bolts for securing the felly.

STREET CAR FENDER.—Patrick Hennessy, San Francisco, Cal. No. 567,388. Dated Sept. 8, 1896. The object of this invention is to provide means for picking up automatically and safely an obstructing body so that it will not be dragged or rolled, but will be raised and carried securely and without material injury. The fender consists essentially of a swinging guard or apron and a lever slidably mounted on the car and so connected with the guard that the contact of an obstructing body will cause the lever to contact with the ground, and said lever will be held while the car continues its movement and the guard will thereby be moved into its carrying position. A latch is provided for holding the lever normally out of contact with the ground, and suitable connections are used between the latch and the guard or apron whereby the contact of the obstructing body will trip the latch. Means are also provided whereby the lever is automatically relieved from contact with the ground when its function is completed. In connection with the main apron or guard, there are swinging side guards or wings and suitable connections whereby the latter are swung upwardly at proper times to confine the body within the main guard. The main guard consists of forwardly projecting separated bars provided with intervening means whereby the obstructing body, when cut, is prevented from falling through between the bars. There is also connected with the main guard a projectable sliding guard, and means for automatically projecting said sliding guard beyond the main guard. There are also fingers slidable upon the extremities of the main frame bars, said fingers being spring-controlled and having joints by which they are adapted to yield in all necessary directions.

DRIER.—Wm. J. Hall and Joseph W. Casper, Sacramento, Cal. No. 567,386. Dated Sept. 8, 1896. This invention belongs to that class of driers in which a foraminous or screen cylinder containing the material to be dried rotates within a chamber and is subjected to heated air therein, though the device may be used for the drying or curing of any material to which it is adapted. The special object in view is to provide a simple and effective machine or apparatus for drying and curing hops. The drier comprises a tight chamber or compartment having an air inlet and an exhaust stack for inducing a current, concentrating rotating screen cylinders mounted within the chamber or compartment, the outer cylinder being adapted to receive the material to be dried, and one end of the inner cylinder communicating with the exhaust stack, open-topped casings in the lower portion of which the air is admitted, and independent heaters in said casings for heating the air as it passes to the cylinders. There are also gates controlling the admission of air and vertically disposed steam pipes in said casings for heating the air as it passes to the cylinders. There is also a steam pipe leading into the vent stack and a perforated steam connected pipe within the compartment for admitting moisture as required

Coast Industrial Notes.

—The California Navigation and Improvement Company contemplates having built two fast boats to ply between this city and Stockton.

—At Ensenada, Lower California, a water system is to be built to supply the city with 200 inches of water from the San Antonio range. The Governor has placed the labor of 100 soldiers at the disposal of the engineer.

—The Board of Supervisors of Sacramento county has agreed to advertise jointly with the Supervisors of El Dorado county for the construction of a new steel bridge across the south fork of the American river, between Sacramento and El Dorado counties, near Mormon island.

—The Union Iron Works has secured from the United States Government a contract to build a new battleship for $2,675,000. She will be larger than the Oregon and similar to the Kearsarge and Iowa. The following are her dimensions: Length on load water line, 368 feet; molded beam, 72 feet; mean draft in normal displacement, 23 feet 6 inches; normal displacement, 11,500 tons; total displacement, 12,500 tons; total coal capacity, 1,200 tons; horse power, 12,000; speed, 16 knots per hour; belt armor, 6½ inches thick, 7 feet 6 inches deep; transverse armor, 12 inches; barbette armor, 15 inches; turrets, 17 inches; top of turrets, 5½ inches; protective deck, flat, 2¾ inches; protective deck, slopes, 5 inches. The battery will consist of four thirteen-inch rifled guns, fourteen six-inch rapid-fire guns, six six-pounders, four one-pounders, four machine guns and one field piece. The ship will carry 200 rounds of ammunition for the thirteen-inch rifles, 2,600 rounds for the six-inch rapid-fire guns, 10,000 rounds for the six-pounders and 2,400 rounds for the one-pounders. She will also carry four broadside torpedoes and display four searchlights.

Recently Declared Mining Dividends.

Galena, Utah, $5000, payable September 20th; a total of $51,000.

Utah of Utah, $2000, payable September 20th; a total of $171,000.

Bullion-Beck Mining Company of Utah, $30,000, payable September 20th.

Portland Gold Mining Company, Colorado, $30,000, payable September 15th.

Personal.

JAMES D. HAGUE is in New York.

M. BRETTON, of Minersville, Trinity county, has gone to France to interest French capital in the development of mines in that district.

LUDWIG KLOZ, who has been superintendent of the El Paso smelting works, and was formerly at Leadville, has been appointed assistant metallurgist at the Broken Hill mines in Australia, upon the recommendation of Superintendent Ropp of the Selby smelting works. The chief metallurgist at Broken Hill, W. Koehler, is also an American.

Obituary.

W. S. MILLS, at one time manager of the Southwestern Mining Company of El Dorado canyon, Lincoln county, Nevada, died September 4th, at his home in Los Gatos, aged 76.

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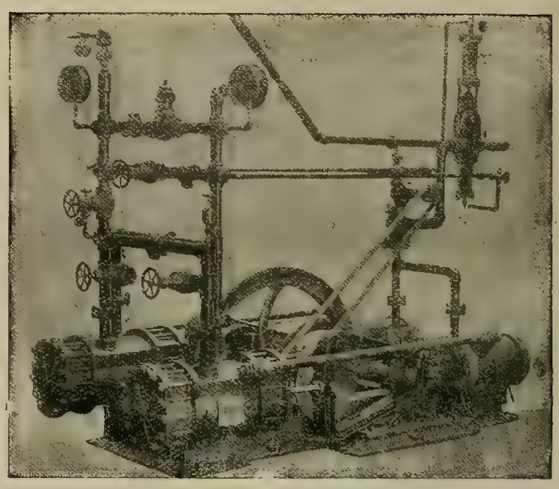

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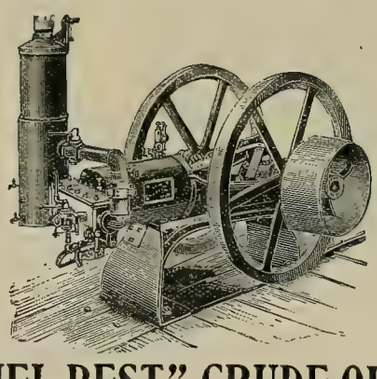

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Coal Gas, ten hours' run, 1000 feet	$2 00
Gasoline (74 deg.), ten hours' run, 3⅜ gallons @ 14c.	1 25
Coal Oil, ten hours' run, 7½ gallons @ 10c.	75
Crude Petroleum, asphaltum base, 16 gallons @ 3c	48
Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c	65

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon=21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

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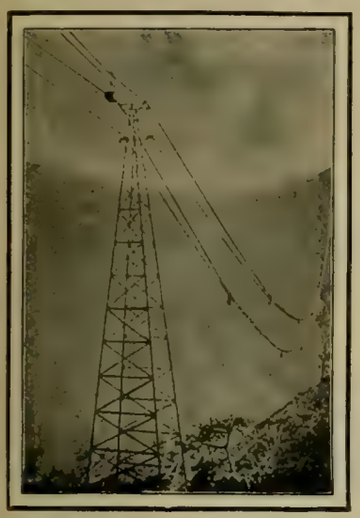

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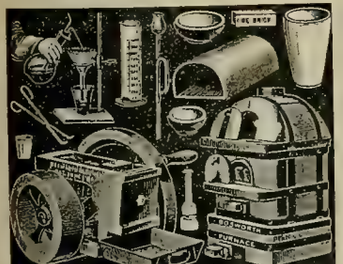

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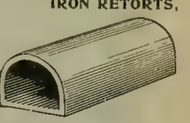

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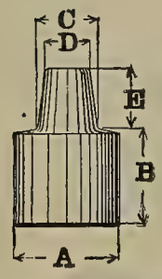

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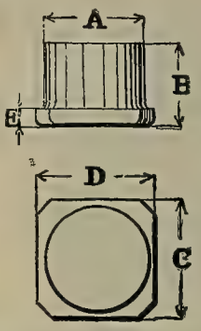

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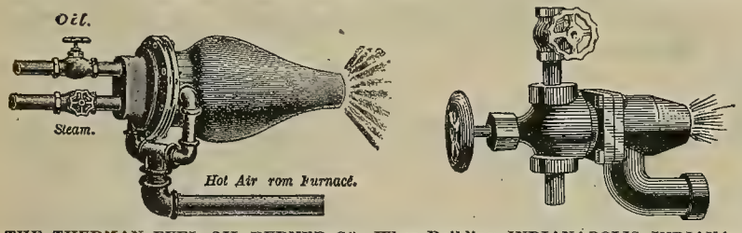

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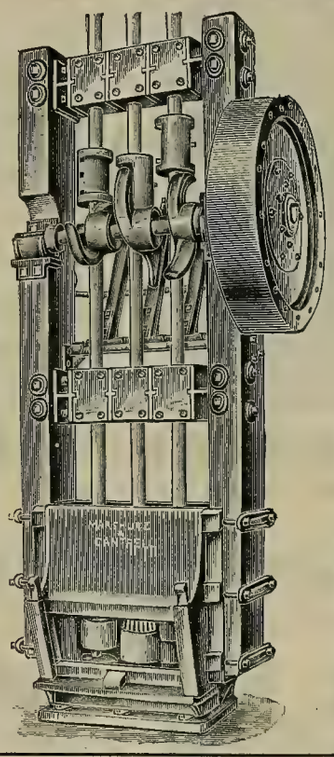

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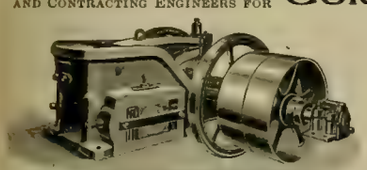

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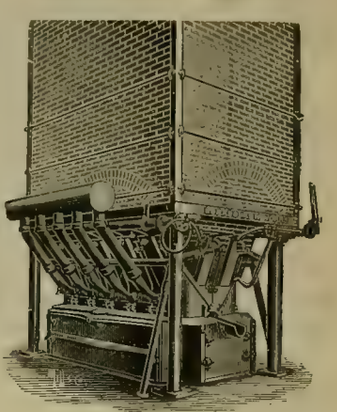

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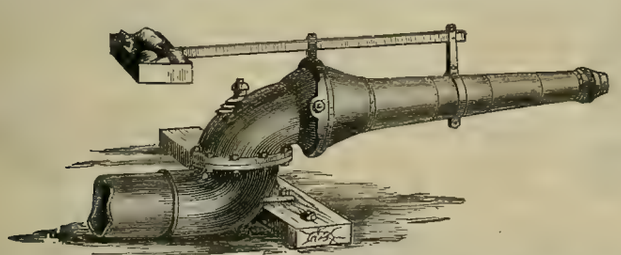

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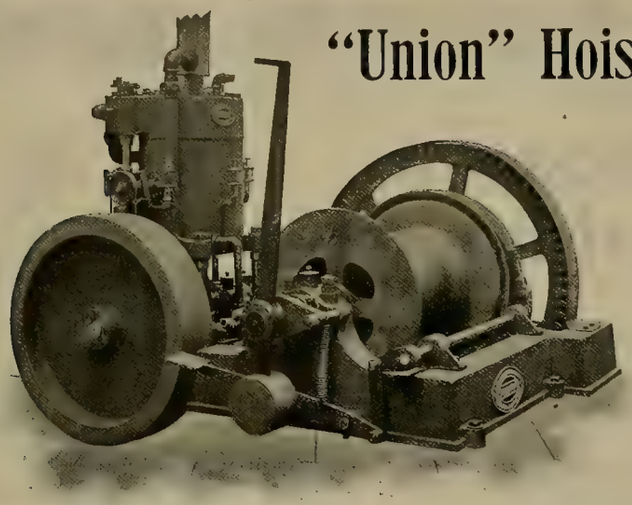

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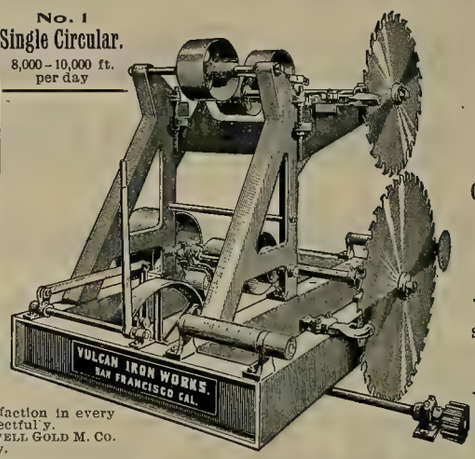

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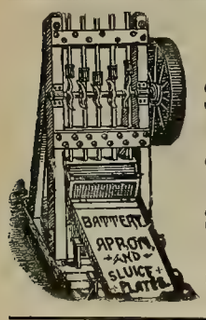

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I. S. Van Winkle & Co., 413 Market St.

SAN FRANCISCO, May 27, 1896.

DEAR SIRS:—In a letter just received from our Superintendent, Mr. Trowbridge, he says, referring to your Concentrator: "The new Springer Concentrator is fulfilling every expectation. A few minor points may be improved upon, but in its main features it is almost perfect. I shall write more fully after further work." Yours very truly, W. H. PAYSON,
Secretary Bald Eagle Mining Co.

Extract from Letter of W. S. Trowbridge, Superintendent Bald Eagle Mining Co. June 20, 1896.

"We work twenty tons of ore per day and size out all coarse portion after it has been worked over two other machines, and run all the slimes and finer portions over your machine. I think it would easily handle twice the quantity. It is certainly doing splendid work now, in a difficult place. I believe the belt will wear indefinitely."

July 12, 1896.

Ship us by steamer another six-foot Canvas Belt Springer Ore Concentrator and have the new Rubber Flange attachment, and put a rawhide belt on wheel. Yours truly. W. H. PAYSON,
Secretary Bald Eagle Mining Co.

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MACHINERY AND SUPPLIES
INGERSOLL-SERGEANT PISTON INLET AIR COMPRESSORS AND ROCK DRILLS
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PARKE & LACY COMPANY
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UNITARIAN LITERATURE sent free on application. Address Postoffice Mission Committee, First Unitarian Church, corner Geary and Franklin streets, San Francisco. Mention this paper. *

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 17, 1896.

General business holds up well, with a steady increase in the volume of goods going out, notwithstanding the retail trade being in as small quantities as possible, not knowing what influence the election in November will have on trade and finance. This conservatism prevails over the coast, and, so far as reports go, throughout the United States, which would indicate that the future has been discounted and the expected will not take place. The gold mining industry does not appear to be affected, for the inquiry for good propositions continues fair. The trouble now is that owners ask too much money, which is against their selling. Manufacturers report a continued good business in all branches of that industry. The almost certainty that the Union Iron Works will get a contract to build one of the new battleships is quite a favorable factor with us. This means more men to be put to work and increased consumption of iron, copper, etc.

The local money market is essentially unchanged. There is continued hoarding of money but the banks are not only meeting all demands but are accumulating funds. Collections are reported to be free which greatly eases the general situation. The advancing markets for wheat is a very important factor for the more farmers get for their produce the better it is for the country at large, particularly on this coast, where such a surplus of wheat is harvested each year. The money markets at the East are shaping more in the interest of borrowers owing to continued heavy importation of gold. It is the impression now that the imports of this country this year will aggregate over $60,000,000 owing to higher prices for grain and improved foreign demand for cereals, provisions, machinery and cotton. In England the rates of interest are higher and strong at the advance. This is largely due to the demand for gold for America, Austria-Hungary and Russia, and also an improvement in general business.

New York Silver Prices.

NEW YORK, Sept. 17.—Following are the closing prices for the week:

	Silver in— London.	N. Y.
Friday	30⅜	65⅞
Saturday	30 3-16	65
Monday	30	64¾
Tuesday	30	64¾
Wednesday	30¼	65⅛
Thursday	30⅜	65⅜

	Copper.	Lead.	Iron.	Tin.
Friday	10 75	2 77½	10 25@12 50	13 15
Saturday	10 75	2 77½	10 25@12 50	13 15
Monday	10 75	2 80½	10 25@12 50	13 05
Tuesday	10 75	2 80	10 25@12 50	13 05
Wednesday	10 75	2 80	10 25@12 50	13 10

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, glit edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	10
New York Telegraphic Transfer	15
London Bankers' 60 days	$4.83
London Merchants	$4.82
London Sight Bankers	$4.85
Refined Silver, peroz., 1000 fine	65¾
Mexican Dollars	50½@51½

SILVER.—The market continued to ease off in Europe and at the East up to Wednesday when it began to strengthen. The shipments from New York to Europe are on a liberal scale which is considered a favorable sign for better prices as the production is not increasing and the demand seems to be increasing abroad. At the East there is more dealing in silver certificates with the general sentiment on the bear side. On September 11, the Mercantile Safe Deposit Co. held 1,652,496 ounces of silver against which 1652 certificates, or about the full amount, have been issued. It is stated that considerable of these have been loaned to short sellers.

Under the present laws the Government distributes standard dollars in multiples of $500 and subsidiary silver coin in multiples of $200 free of expense to parties desiring the same in exchange for lawful money deposited at the office of any Assistant United States Treasurer. During the past four months Assistant Treasurer Berry of San Francisco has sent out of the City all over the coast silver coin free of expense as follows:

	Silver Dollars.	Subsidiary Silver.
In May	$101,306	$51,250
In June	125,500	89,870
In July	260,500	76,650
In August	199,000	106,295

MEXICAN DOLLARS.—The market is dull and lower. The export inquiry is slack. At New York there is a fair export movement.

COPPER.—The market has held steady. Eastern and European advices are more favorable for an increased consumption. Both abroad and at the East there is an absence of any speculative inquiry. The offerings are made more sparingly.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

ANTIMONY.—The demand is fair, with the market steady at 7¾@8⅛c in a jobbing way. New York mail advices quote 7⅜ for Cookson's, 6⅝c for Hallett's and 6½c for Japanese, from store.

BORAX.—There is nothing new to report. The market is quoted as follows:

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	5¼
Concentrated, "	5⅝

QUICKSILVER.—There is a continued fair demand for both export and home.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

LEAD.—The market has strengthened at home and abroad. The demand at the East has enlarged.

Our market is quoted as follows:

Pig	—	@	3 65
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—The demand is increasing. Stronger prices for lead makes shot firmer.

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—The decline in silver has caused pig to ease off, owing to consumers holding off, besides, the bulk of the season's demand is over.

The market is quoted as follows in jobbing lots:

Pig, per lb	14
Plate, I C coke, heavy, per box	$4 10@ —
" " " light, "	4 00@ —

POWDER.—The demand continues exceptionally free. There is nothing to warrant higher prices.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, "	8½c

IRON.—The market is steadier. Eastern advices are to the effect that large quantities have been taken up by speculators and large consumers, who believe that better prices will rule before long.

Our market is quoted as follows:

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 50
Gartsherrie	21 50	23 50
Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c	
Lake Superior Sheathing		20

COAL.—Both dealers and importers look for low prices throughout the winter. The advance in wheat will send more ships loaded with coal to this port. The demand from consumers is increasing.

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 00@ 5 50
Coos Bay	— —@ 4 50
Cannel	— —@ 8 50
Egg, hard	— —@11 50
Wallsend	— —@ 7 00
Scotch Splint	— —@ 7 50
Brymbo	— —@ 7 50

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—The demand is dull for home and fair for export.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is barely steady.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, Sept. 17, 1896.

The market ruled quiet and dull with an easy tone up to yesterday, when there was a firmer feeling in the middle and north end shares. The improved tone seems to be somewhat on the surface, that is, there is absolutely nothing to warrant it outside of a prospective gamble for better prices on the work going on in several of the mines, more particularly on the Brunswick lode. The Comstock lode, except to the west, has been largely honey-combed and therefore the chances for finding a big body of good ore is rather slim, but the Brunswick lode is an unknown quantity and therefore there are chances of finding quite a body of ore. This makes the shares of the mines on that lode more of a gamble. The west workings on the Comstock will take time and the expenditure of considerable money to find the west lode, and after struck, it will take a still longer time to develop it so as to take out the ore. That there is ore to the west is not doubted by the better informed mining men and it looks as if the management of Con. Virginia and Ophir have determined to find if there is. Several mines on the west lode were worked years ago and two or three proved quite rich, but owing to their not being able to handle the water that came in work had to be suspended. Since then several long west crossdrifts have been run and it is not at all unreasonable to assert that the west lode has been drained to a considerable depth. When work is started to the west at several points and in right good earnest then the shares of the Comstock mines will be quite a gamble; as they now are the moves up and down are largely on short sellers with some outside buying, for, so far as our advices go, the management of the mines do not expect to find much ore, not enough to raise the market to any great extent. What is to be reported found will be more for the purpose of selling shares so as to collect assessments already paid by manipulators and also those levied and to be levied.

From Virginia City our advices regarding work on the Comstock lode are of rather an uninteresting character. Everything points to time and considerable work before anything of a positive character can be determined, but while the work is progressing some ore is liable to be run into. In Utah, Sierra Nevada and Union the work is in the same levels and direction publishsd last week. Some mining men are watching that under way in one of these mines with considerable interest. In Mexican, Ophir and Con. Virginia work is being pushed to the west on the 1000-foot level. In the two former they are liable to start exploiting work before long. On the Central tunnel level in Ophir they are still at work, with the ore showing a slight improvement, but too low grade to extract. In Con. Virginia interest in the work to the east on the 1650-foot level seems to have died out. They raised 122 tons of ore last week which assayed over $36 a ton. After paying all expenses for August the company had over $17,000 in cash. This will meet the September expenses. In Gould & Curry and Best & Belcher the work is still to the east. Work has been suspended in Savage for two weeks so as to make some needed repairs. From Hale & Norcross the news from the 900-foot level continues favorable. They are getting ready for more active work on the 1100-foot level. Chollar raised less tons of ore last week. The assay was lower. Work was still being done on the 450-foot level. In Potosi at date of last advices some needed repairs were being done. It is reported that in the Bullion long crossdrift the formation is more favorable. From Alpha, Con. Imperial and Challenge nothing new comes to hand. Confidence did not extract any ore the past week. Now that Yellow Jacket is assessed more men ought to be put to work. It is not at all likely that anything of consequence will be done at that end until outsiders sell more shares and Kentuck treasury stock is disposed of. In Crown Point active work is under way at several points. Ore assaying $7 to $11 a ton gold is reported struck. Belcher raised 65 tons of ore the past week and Seg. Belcher about 20 tons. The ore was fair grade only. Overman is still taking out a few tons of ore each week. The Alta letter is uninteresting—perhaps shares are wanted by the management, as another assessment has been levied.

Interest in the work on the Brunswick lode centers largely on the Chollar-Hale & Norcross 400-foot south drift. By Saturday this drift will be extended fully 100 feet from the shaft station, and it is only 120 feet from the station they expect to cut the downward continuation of the ore found on the 300-foot level. If there is an improvement the shares will probably sell for more money, to make shorts fill and sell some stock, but if the showing is poorer, then for less money. While this drift is being run, the shares in Chollar and Potosi will be a gamble. In Occidental, some ore is being milled. It assays around $13 a ton. The work in this mine, Hale & Norcross, Savage, Gould & Curry and Best & Belcher is of the same character reported last week.

From the Bodie district the news is unimportant. Considerable work is being done in Standard, Bodie and Bulwer. These mines appear to be run as a business proposition and not as a gamble in shares.

From the Silver King, Arizona, an improvement comes to hand.

The following illustrates the changes of the week:

MINES.	Sept. 10.	Sept. 17.
Alpha	$ 17	$ 17
Alta Consolidated	07	.....
Andes	.....	.....
Belcher	59	52
Best & Belcher	1 10	1 00
Bodie	.....	63
Bullion	09	19
Challenge	51	.....
Chollar	2 30	2 35
Confidence	.....	1 35
Consolidated California and Virginia	1 90	1 80
Consolidated New York	.....	.....
Crown Point	34	30
Exchequer	.....	.....
Gould & Curry	61	56
Hale & Norcross	1 50	1 50
Justice	.....	05
Mexican	62	.....
Ophir	1 15	99
Overman	.....	15
Potosi	1 00	.....
Savage	66	.....
Sierra Nevada	77	75
Union	46	42
Utah	10	.....
Yellow Jacket	36	33

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.		Secretary.
Alpha Con M & M Co, Nev	17	10c	Aug 3	Sept 7	Sept 29	C E Elliott, 309 Montgomery
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24	Sept 24	Oct 24	E D Farish, 632 Market
Bay State M & D Co, Cal	33	3c	Aug 21	Sept 30	Oct 20	F E Luty, 330 Pine
Bullion Mining Co, Nev	42	10c	Aug 14	Sept 15	Oct 8	R R Grayson, 331 Pine
Belcher S M Co, Nev	53	25c	Aug 5	Sept 10	Sept 30	C L Perkins, Mills Building
Central Eureka	3	2c	Sept 3	Oct 10	Nov 2	Wm A M VanBokkelen, 320 Sansome
Channel Bend M Co	4	2c	Sept 14	Oct 16	Nov 7	J P Langhorne, 39 Sutter
Confidence S M Co, Nev	27	30c	July 30	Sept 3	Sept 24	A S Groth, 414 California
Con Imperial M Co, Nev	37	1c	July 24	Aug 27	Sept 22	C L McCoy, Mills Building
Crown Point M Co, Nev	68	20c	Aug 18	Sept 23	Oct 13	J Newlands, Mills Building
De Soto G M Co	1	7c	Sept 7	Oct 10	Nov 9	E H Clark, Mills Bldg
Gold Bar Con M Co, Cal	4	2c	July 13	Aug 20	Sept 21	E C Godfrey, Crocker Bldg
Quaker G M Co	40	12c	Sept 7	Oct 8	Nov 5	C W Poindexter, 418-420 Market
Gould & Curry S M Co, Nev	79	15c	Sept 1	Oct 5	Oct 27	A K Durbrow, 309 Montgomery
Jamison M Co, Cal	8	5c	July 6	Sept 7	Sept 28	Sam W Cheyney, 120 Sutter
Occidental Con M Co, Nev	24	10c	Sept 2	Oct 8	Oct 29	A K Durbrow, 309 Montgomery
Reward G M Co, Cal	1	3c	Aug 8	Sept 14	Oct 5	J Stadtfeld, 309 Montgomery
Sierra S M Co, Nev	111	25c	Aug 7	Sept 11	Oct 1	E L Parker, 309 Montgomery
Union Con S M Co, Nev	53	20c	Aug 25	Sept 28	Oct 22	A P Swain, 309 Montgomery
Utah Con M Co	23	5c	Sept 10	Oct 13	Nov 2	A W Havens, Nevada Block
Yellow Jacket S M Co	61	25c	Sept 11	Oct 15	Nov 20	W H Blauvelt, Mills Bldg

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Anchor Coal and Development Co	E D Farish, 632 Market	Oct 20

San Francisco Stock Board Sales.

SAN FRANCISCO, September 17, 1896.

9:30 A. M. SESSION.

100 Belcher	52	200 Gould & Curry	56
200 Best & Belcher	1 00	500 Kentuck	07
100 Bodie	63	100 Occidental	52
350 Crown Point	29	100 Yellow Jacket	33

SECOND SESSION—2:30 P. M.

200 Ophir	99	50 Confidence	1 35
500 Gould & Curry	55	400 Sierra Nevada	75
100 Best & Belcher	1 00	200 Overman	15
100 Con Cal & Va	1 80	100 Justice	05
150 Chollar	2 35	550 Occidental	50
150 H. & N.	1 50	300 Scorpion	07
450 Crown Point	30	100 Benton	15
300 Alpha	17	100 Union	42
100 Belcher	51		

"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above intereating book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colo.

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Assessment Notices.

ANCHOR COAL AND DEVELOPMENT COMPANY. Location of principal place of business, San Francisco, California; location of works, Kelso, Cowlitz county, Washington.

Notice is hereby given that at a meeting of the Board of Directors held on the 24th day of August, 1896, an assessment No. 5 of Three Cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market Street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-fourth (24th) day of September, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on SATURDAY, the twenty-fourth (24th) day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. D. FARISH, Secretary.

Office, No. 632 Market Street, Room 5, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the first day of September, 1896, an assessment (No. 79) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the fifth (5th) day of October, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 27th day of October, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No 69 Nevada Block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 2d day of September, 1896, an assessment (No. 24) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 69, Nevada block, No. 309 Montgomery streg, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of October, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on THURSDAY, the 29th day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

ANNUAL MEETING.—The Annual Meeting of the stockholders of the Anchor Coal and Development Company will be held at the office of the Company, No. 632 Market St., room 5, San Francisco, California, on TUESDAY, the 20th day of October, 1896, at 1 o'clock P. M., for the purpose of electing a Board of Directors for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, October 17th, at 12 o'clock M.

E. D. FARISH, Secretary.

Office—Room 5, No. 632 Market street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from W. H. Leek, in the Miocene mine, near Crescent Mills, Plumas Co., to deposit tailings in Rush creek; from Hugh Craig, in the Casajo mine, near West Point, Calaveras Co., to deposit tailings in the middle fork of the Mokelumne river; and from John Faubel, in the Mad Mule mine, near Stella, Shasta Co., to deposit tailings on the bank of Whisky creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on September 21, 1896, at 1:30 P. M.

GOLD MINING PROPERTIES.

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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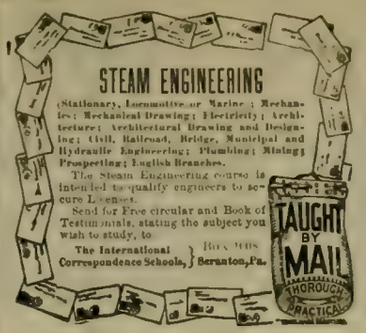
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DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Cert.	No. Shares.	Amt.
E. C. Cain	170	2,500	50 00
E. C. Cain	171	2,500	50 00
C. L. Dingley, Jr	72	800	16 00
C. L. Dingley, Jr	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	169	3,803	76 06
E. C. Godfrey, Trustee	140	6,667	133 34
E. C. Godfrey, Trustee	143	1,533	26 64
E. C. Godfrey, Trustee	167	1,809	36 18
E. C. Godfrey, Trustee	141	1,667	33 34
E. C. Godfrey, Trustee	142	3,000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	83	2,000	40 00
J. F. R. Landis	138	1,000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6,000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2,500	50 00
Jos. A. Pratt	2	2,500	50 00
Jos. A. Pratt	3	2,500	50 00
Jos. A. Pratt	54	2,500	50 00
John E. Todd	5	2,500	50 00
John E. Todd	6	2,500	50 00
John E. Todd	9	2,500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until WEDNESDAY, October 21st, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California. E. C. GODFREY, Secretary.

DELINQUENT SALE NOTICE.

THE JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, on Jamison Creek, near Johnsville, Plumas County, California.

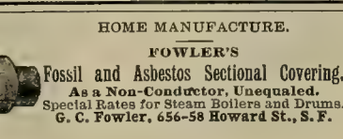
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 8) levied on the Sixth (6th) day of July, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt
A. Hall	112	2,000	100 00
John Sparks	164	1,000	50 00
John Sparks	165	1,000	50 00
John Sparks	166	2,000	100 00
John Sparks	167	1,000	50 00
John Sparks	168	1,000	50 00
John Sparks	169	500	25 00
John Sparks	216	500	25 00
Al. White	236	500	25 00

And in accordance with law, and an order from the Board of Directors, made on the 22nd day of July, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room 50, 120 Sutter St., San Francisco, California, on MONDAY, the 28th day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

SAM W. CHEYNEY, Secretary.

Office, Room 50, 120 Sutter Street, San Francisco, California.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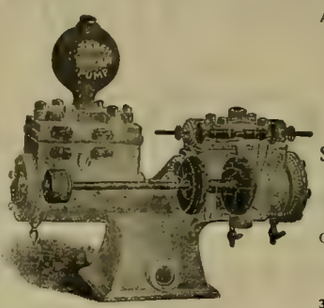

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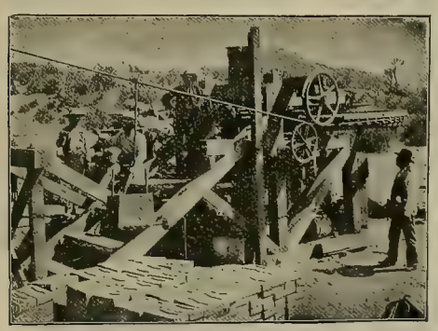

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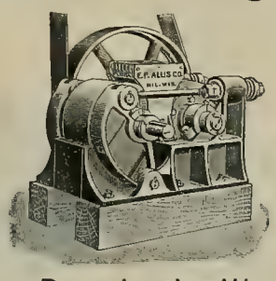

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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1890.—VOLUME LXXIII. Number 13. SAN FRANCISCO, SATURDAY, SEPTEMBER 26, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

An Advance in Gravel Mining.

With the increased interest in quartz mining the world over, there has been a general revival of hydraulic mining. This is not so noticeable in California, owing to the debris question, as it is in the rest of the globe; yet the mining world to-day still looks to California for the best methods of working gravel and uses the systems built up before the debris question arose, which remain to-day the standard the world over. As in quartz mining, the main improvements in hydraulic mining now are in the direction of the reduction of the cost of working. There is, doubtless, many times as much auriferous gravel in the world that will not pay to work as of gravel that will pay with present known methods. Naturally, any improvement in methods that will reduce the cost of handling gravel will result in the opening up of many mines now lying idle. An invention that will reduce the cost of working even a small fraction of a cent per cubic yard or increase the service of a miners' inch of water by a small fraction, will open much gravel that cannot now be worked to a profit. There is a great inducement offered for effort in this direction. Outside of California there are many large fields for operation in gravel; for example: Siberia, New Zealand, Spain, British Columbia, Colorado, Idaho and Wyoming.

In Idaho, Wyoming and Colorado, especially, there has been a great deal of activity within the last six months. Very little of the gravel in these States is of high grade and a large proportion of it must be worked with hydraulic elevators, owing to an insufficiency of dump.

Since the closing down of the hydraulic mines in California there has been considerable work done along the rivers with hydraulic elevators. This system of mining is sure to play a very important part in the working of gravels in other parts of the world. All the energies of those engaged in this class of mining have been toward increasing the service of the water. A large proportion of the water is required for washing down to the pits. It is well known that the water in the elevators themselves will lift all the gravel that can be gotten into the elevator, and the question has been how to supply the largest amount of gravel.

There has been invented a new form of hydraulic elevator, herewith illustrated, which, with the use of an auxiliary feed, will enable a larger amount of gravel to be supplied to the elevator. The result will be an increase in the service of the water available in any mine worked under this system, and a large decrease in the cost per cubic yard of handling gravel. It is an invention of George H. Evans, general manager of the Golden Feather mines in Butte county, and promises to do much for that class of mining.

We present two cuts, one representing the improvement referred to in the Evans hydraulic elevator (see page 256), and the other showing a scene on the Golden Feather property in Butte county, where it is in operation. The principal features of the elevator are the three suctions, one main and two auxiliary, the two auxiliary allow the water and material to enter at the back of the seat, thus reducing the wear and tear on machine. It is the auxiliary opening that increases the efficiency of the elevator by allowing the proper proportion of air to enter with the water and material, even when main suction opening is choked.

The auxiliary suction openings can be extended with any size pipe to any distance beyond the elevator proper, and be used for draining places in the bedrock below the line of sluices connecting with elevator. This is a great advantage and can be carried on without interfering with the sluicing of material to main opening in elevator seat. This elevator, it is claimed, will show from 20 to 30 per cent greater efficiency than elevators heretofore used, as has been proved by the operations at the Golden Feather channel, where a number of them are in operation.

Another point in its favor is, that it is not necessary to sink a shaft to bedrock to place the machine in position to work. They are easily manipulated, and so light that they will sink their own pits, thereby avoiding not only a loss of time, but the great expense of sinking and pumping in wet ground. The usual way of setting the elevators is to fit them together on the bank and lower them into position, two men doing all the work necessary. All the joints on the elevators are made with revolving flanges, which, with taper rings, will make any adjustment necessary for rapid connection.

GIANT AND ELEVATOR IN OPERATION AT THE GOLDEN FEATHER.

In placing two of the 16-inch elevators in position at the Golden Feather this year, they were fitted up, lowered to the bottom of river, and working (each throwing 18,000,000 gallons per twenty-four hours) within twelve hours. All the excavating necessary to be done was a space of four square feet. In placing one of the old style elevators last year, it was necessary to have divers place them in position, and an excavation of 128 square feet was required. There is no necessity to use water elevators in connection with this system of elevating, as one of the auxiliary suctions will take care of all the water in the pit.

They are made of cast iron or of steel, the only difference between them being in the weight, those of steel being lighter and more easily handled, and may be made in sections weighing not more than 190 pounds, suitable for mule transportation. They weigh considerably less than the old-style machines.

At the Golden Feather mines they elevate gravel 15 feet with 100 feet of pressure, and in two cases they have elevated to a height of 52 feet with 250 feet pressure. With a 2¾-inch jet there was elevated all the water from a 2½-inch giant with the same head, together with all the gravel and sand it was possible to pipe down the sluice with a grade of 3 inches to 12 feet. In the last instance, only 400 inches of water was used for both elevator and giant, and 2400 tons of material were elevated daily. The elevator was of cast iron and lasted three years. At the Golden

(Continued on page 256.)

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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Our latest forms go to press on Thursday evening.

J. F. HALLORAN.....General Manager

San Francisco, September 26, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Giant and Elevator in Operation at the Golden Feather, 253. Evans Hydraulic Gravel Elevator, 256. The Jeffrey Mine Pump, 259.

EDITORIAL.—An Advance in Gravel Mining, 253. A Secretary of Mines; The Mines and Home Markets; Abandonment and Relocation; The State Mineralogists' Report, 254.

SCIENTIFIC PROGRESS.—The Utility of Inventions; The Electric Furnace; The Manufacture of Hard Steels; The Geology of California; A Pair of Scales Discovered While Excavating Near Thebes; A Gas Exposition to be Held; To Attempt Getting to the Top of Aconcagua, 259.

MECHANICAL PROGRESS.—The Jeffrey Mine Pump; German Export Trade in Barb Wire to Japan, 259.

ELECTRICAL PROGRESS.—Development of Electricity as Motive Power; Electric Headlights on Locomotives; An Electric Trolley Railway Between New York and Philadelphia, 259.

PRACTICAL INFORMATION.—Proposed Polar Exploration; The First Railroad in Korea; The Birth Rate in the United States; Pumice Stone; A Terrible Hailstorm; Nausea in the Brain; Paraffine; A Monument to John and Sebastian Cabot; Elephants in Africa, 260.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 262-63.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 270.

MISCELLANEOUS.—Concentrates, 255. Gold Deposits in Nicaragua; Improved Processes for Reducing and Saving Precious Metals, 256. To Sink a Shaft One Mile; Gold Mining in California, 257. The Cyanide Process at the Utica Mine, 258. Coast Industrial Notes; Personal; Recent Patents; Notices of Recent Patents; Recently Declared Mining Dividends; Recent Mining Incorporations; Commercial Paragraphs, 261.

Abandonment and Relocation.

In cases where applications are made for mineral land at the United States land offices it often happens that the applicants take no further steps to secure their patents beyond surveying and publishing the applications. Where this same ground is relocated after abandonment, and after failure to do the necessary required assessment work, the relocators, upon filing their applications, are placed to the necessity of proving abandonment. This, it seems, works an unnecessary hardship. Now the new owner must go into court and prove that the claim was abandoned by the original locator and applicant. It seems that the present law does not designate any time after the publication of the notice within which the applicant must make entry, but can do so years afterwards at his leisure. It is reported that the land department will shortly issue an order notifying all applicants to make entry of their claims within a reasonable time after publication, otherwise all proceeding will be declared void.

The Mines and Home Markets.

The Baker City *Bedrock Democrat* says that there is not another city in the West where the people have enjoyed such unwavering prosperity during the panicy times as Baker City, and attributes this largely to the mines of Southern Oregon. These mines have made a home market for agricultural and other products of that part of the State. More than that, there money is kept at home and in circulation, and any stringency in the money markets of the outside world is not felt. Much the same may be said of Scott valley, in Siskiyou county. There is claimed to be more wealth in that fertile little valley per inhabitant than in any other part of California. Its lands are exceptionally rich and the climate guarantees certain crops. Yet there is no rail communication with the outside world through which to carry the products to the larger markets, and this is not necessary, for in the mountains of northern Trinity and over on the Salmon river, and in other parts of Siskiyou, the farmers of Scott valley have for more than a generation found a market among the miners for their products. The producer and consumer, too, come into almost direct communication without the intercession of middle men.

There can be no better way of building up a home market for California products than through the opening up of our mines, and for this reason the farmers of this State should look with favor upon any steps proposed for the betterment of the mining industry.

The State Mineralogist's Report.

The thirteenth report of the State Mining Bureau has been filed at Sacramento and will be printed and ready for publication about the first of December. Mr. Crawford, the State Mineralogist, has wisely led the work of the bureau into lines in which, with the present organization, it could do most good. The result is shown in the way of papers of practical value on special subjects. Naturally much of the report is taken up with statistics, and which of necessity the State must publish.

Mr. Crawford suggests that the bureau should be placed on a permanent basis as to funds, like the State University, in order to produce work of a superior character. As long as it leads an ephemeral life, existing from Legislature to Legislature, it is impossible to take up certain lines of scientific work that the character of the institution demands. This has been especially noticeable in the geological work that has been done by the State in the past. Good men cannot be engaged without a certainty of employment. More than that, many changes of men have led to many changes in methods, resulting in a large loss of money and in a great deal of confusion in the work itself. However, the experience of the future in the geological work done by the State of California will be much like what it has been in the past, unless some change can be brought about in the method of the appointment of the men who carry it on. As long as the appointment of these men remains in the hands of the Governor, they may be changed with every administration. With every change will come a change in the methods of the work that will lead to confusion, loss of money and a failure to accomplish satisfactory results.

Mr. Crawford makes a suggestion as to the future work of the bureau that will commend itself to all who are interested in the bureau, and that is the separation into two departments of the mining and the geological work. On this he says:

"It has been felt, however, for some time that, as the bureau is organized, neither the mining work nor that in geology can be carried on to best advantage together and by the same assistants. The work in mining, with the growing details of the present day, needs men especially trained in all the aspects of that important industry. So it is, also, with the lines of geological investigation. The time was when the science was much less complicated, and a man could be an expert not only in all the problems then connected with mining, but also a practical geologist. Now, the best results can only be reached by men trained each in his own special line, and while the two subjects of geology and mining are, in certain aspects, intimately related, yet in others they are widely separated.

"Consequently it has been thought best to recommend, for the fullest efficiency of the State Mining Bureau, that the work of mining proper be separated from that of geology. That the former be devoted mainly to the examination of mines and the gathering of statistics relating to them. In this work only the most experienced assistants—mine inspectors—should be employed, and given power by law to enter all mines, report upon their condition, and enforce, where needed, better and safer working methods. This would prove a direct benefit and safety to the working miner and a protection to the stockholder and investor.

"It is proposed that the work in geology be organized in the form of a geological survey, as a department of the Mining Bureau and have an experienced geologist in charge. * * * The scope of the geological survey must be broad in order to secure the most important economic returns, and should embrace the following main lines of investigation:

"1. The preparation of a topographical contour map in the form of atlas sheets, to be carried on in connection with the United States Geological Survey. * * *

"2. Mapping of geological formations in important local areas, finally spreading over the whole State not covered by the United States Geological Survey. * * *

"3. Systematic collection of representative specimens of the mineral and rocks of different formations in the districts explored. With but slight extra expense duplicate collections can be made for the high schools of the State, a course which would be of great educational value.

"4. A study of building stones.

"5. A description of mineral springs and analysis of waters.

"6. Dissemination of the principles of geology and mineralogy among the people of California, especially prospectors and investors."

Mr. Crawford's suggestion that the State Geological Survey should work on the same lines as the United States Geological Survey, we do not think a good one. It is true, as he says, that the publication of the topographical maps of the United States Geological Survey is very slow and that they are not published for general circulation. The latter objection can easily be remedied. The former objection will hardly lie, because, before the State Geological Survey would be able to cover the ground already mapped by the United States Topographical Corps, they would have other maps out and keep the State surveyors at work for years to come. We see no reason why the State should pay for doing work that is being done by the United States Geological Survey and being done so well.

The work of the United States Geological Survey naturally is on broad lines. Their work should be filled in in detail by the State. However, there need be no trouble about arranging to co-operate with the United States Geological Survey in the work, provided the State Geological Survey is conducted by men fitted for the work. Under the present political system of appointment it is no likely that such men will be obtained and it is not likely that the United States Geological Survey will be willing to co-operate with them.

Among the papers on special subjects are "Ore Deposits With Special Reference to the Mother Lode," by Harold W. Fairbanks; "Water Power and Compressed Air Transmission," by Arthur De Wait Foote; "Preservation of Mine Timbers," by John D. Isaacs; "The Sampling and Measuring of Ore Bodies and Mine Examinations," by Edward B. Kirby; "Comstock Ore Sampling," by John D. McGillivray; "Electric Power Transmission Plants in California," by W. F. C. Hassen; "Petroleum, Its Origin in California, etc.," by F. Salathe Ph.D.

A Secretary of Mines.

Last June we suggested the advisability of establishing a Department of Mines under the Federal Government at Washington. The editorial written then has borne fruit. In our issue of the 12th the secretary of the California Miners' Association suggested that that Association take steps toward establishing such a bureau. In a late issue the Spokane *Chronicle* says, in connection with the coming meeting of the Northwest Mining Association: "Another thing that is being pushed by the Northwest Mining Association is the establishment of a National Department of Mining, with proper representation in the President's cabinet. Nearly five hundred letters have been written to the different universities, mining schools, geologists, mining men, etc., throughout the country on this subject, pointing out the advisability of such a department being established in the United States and endeavoring, through their co-operation, to procure the establishment of such an office."

In the thirteenth report of the State Mineralogist, filed last week at Sacramento, in his letter of transmission to the trustees, Mr. Crawford says: "It is confidently believed that the mineral industry of the whole country would be greatly improved should a department of mines be created in the United States Government. The various bureaus relating to mining are scattered through the several existing departments, and as a matter of economy, as well as the means of stimulating and encouraging more full and systematic development and research, such a department should be created."

No industry does nor has done so much for the development of this country as mining; no industry has added more directly to its wealth, and there is no industry that has received less recognition. The advantages that would accrue from the establishment of a department of mining would be far more to the benefit of other industries than even to mining itself.

Concentrates.

It is proposed to erect a 10-stamp mill in the Louisiana mine in Mariposa county.

The Faulkner mines, near Forbestown, Butte county, have been bonded by capitalists from Texas.

There are 975 voters registered in Reno—a gain of over 300 over the registration of two years ago.

H. P. Stoy of Forbestown has purchased the Golden Queen quartz mine, which adjoins the Gold Bank.

An attempt was made last week to burn the mill building on the Linderaxa mine in Calaveras county.

Three daily stages now ply between Mojave and Randsburg to accommodate the traffic to the mines.

English capitalists have bonded the Winnamuck mine in the Bingham district, Utah, for, it is understood, $100,000.

The Noble Five mine in the Kootenay country, B. C., contemplates erecting a concentrator with a capacity of 100 tons daily.

Representatives of the MacArthur-Forrest process are applying it to the extraction of the gold from the black sands of Idaho.

The Dalton and Lark like the Silver King and other mines in Utah have, owing to the fall in lead, stopped paying dividends.

Estimates of the amount of gold obtained by the miners from the Yukon placers this year vary from $100,000 to $1,000,000.

An order has been placed for sixteen additional tanks in the Mercur mill, which will increase the capacity of the plant to over 400 tons a day.

Articles have been filed for the incorporation of the Palmer Mountain Gold Mining and Tunnel Company at Spokane, with a capital stock of $5,000,000.

The last cleanup made by the Chinese company operating the Montezuma hydraulic mine at South Fork, in Siskiyou, is said to have been nearly $9000.

The Anaconda Company is taking out and shipping from its mines at Belt, Montana, to their works at Anaconda from 1500 to 2000 tons of coal and five cars of coke daily.

The California Exploration Company is pushing work on its electric plant on the river opposite Mokelumne Hill, with about 100 men grading for the plant, digging ditches, etc.

The Park City *Patriot* says that all the machinery for the Peck concentrator at Park City is made and stored away at the factory, where it will remain until after the Presidential election.

At the annual meeting of the W. Y. O. D. Mining Company at Grass Valley the following were elected directors: J. R. K. Nuttall, Joseph Weissbein, Jacob Weissbein, Louis B. Parrott, and T. H. Simonds.

A report comes from Telluride, Col., that last Sunday nine 100 pound sacks of gold ore, valued at $30,000, were stolen from the powder magazine of the Tom Boy mine, where it had been temporarily placed.

The *Mining Journal*, published at Ashcroft, B. C., says that the Cinnabar Mining Company, at Savona's Ferry, own the only quicksilver mine under the British flag, and that they have ordered machinery from San Francisco.

The Calaveras County Miners' Association was formed last week with the following officers: President, F. F. Thomas of the Gwin mine; vice-president, C. Borger of Campo Seco; secretary, Mark B. Kerr of the South Paloma.

The Victor Illuminating and Power Company has been incorporated and has asked the grant of a franchise permitting them to furnish light and power to the city of Victor, Col. The company propose to build works of the most modern type, costing about $30,000.

The Anaconda Mining Company of Montana is to have a new plant at Anaconda, to treat the silver slimes which come from the refinery, with a capacity of producing 500,000 ounces of silver per month. There will be four furnaces and two dry pans, each containing ten tanks.

At a hydraulic mine owned by E. N. Polley at Brandy City, in Sierra county, there is a sluicing flume 6200 feet long, which carries the tailings to a dump in old worked-out ground. This, however, enables him to work only the top gravel, leaving 50 feet of the best paying ground untouched.

Hardly a week passes without the discovery of one of the old fabled lost mines of the West. The "Pegleg" was found a few days ago in southern California, and now comes the discovery of the "Lost Cabin mine," in the Cœur d'Alene country. The exact location is kept secret. That is right.

The engineers will not conclude the survey of the section of the Blackfoot reservation in Montana, ceded by the Indians to the Government, until next summer. Reports from people who have been examining the lands largely discount the tales that have been told of the presence of rich mineral deposits.

The Silver City *Enterprise* says: "W. H. Newcomb has been shipping four cars of iron per day to the smelters. The strike at Leadville has shut off the supply of iron ore from that point and as the smelters must have iron for a flux, the ores of Grant county are the next nearest available supply."

The Utah Asphaltum Company have sold a carload of asphaltum for Eastern shipment, and if the quality proves satisfactory they will have a steady market for all they can mine. The deposit is on the line of the Rio Grande Western railway, apparently in the same belt as the gilsonite of the Uintah reservation.

A telegram from Redding announces that the smelters at Iron Mountain have resumed operations with increased force and capacity. The plant is working smoothly and is a complete success. About 1000 men are now employed and before the end of the month 2000 will be employed. Five hundred roasters are being built.

Bulletin No. 9 of the State Mining Bureau, "Mine Drainage, Pumps, etc.," by Hans C. Behr, is ready for distribution, and it will be found of great value to many miners in California as well as elsewhere, for there has not been any comprehensive treatise on this subject within easy reach of the majority of miners in this State. It is the publication of works like this, on special subjects, by acknowledged authorities, that will do more than anything else for the reputation of the Mining Bureau.

Last week the mining brokers of Spokane held a meeting to plan for the organization of a mining exchange in that city. They say it is needed to place the legitimate mining properties properly upon the market in order to discriminate against wild cats and in other ways to establish the prominence of Spokane as a mining center.

There has been no quicksilver mined in Australia, but reports come that discoveries of cinnabar have been made on the Clarence river, and the Cinnabar Prospecting Company claim that the existence of lodes has been proved for a length of 2250 yards in the property, and that some of them were large and had given a high percentage of metallic mercury.

Last week orders were received in this city for hydraulic giants for the gravel mines at Astorga, in the Cantabrian mountains, in the northern part of Spain. These mines were worked by the Romans, but abandoned under Spanish rule, and are now being reopened on a large scale by a syndicate of French capitalists. Joseph McGillivray, formerly of this city, is acting as their consulting engineer.

During the past six months a number of tunnel enterprises have been started in the Cripple Creek district, such as the Squaw mountain, Watson, Raven, Beacon hill, Anaconda, Moffitt & Bush and Golden Gate Tunnel & Transportation Company tunnels. These tunnels, or tunnel sites, are located and surveyed to cut at right angles the veins of the rich mountains of the Cripple Creek district. The tunnel, by law, is entitled to the discoveries and location of all lodes discovered.

The Calaveras *Chronicle* says that mines around West Point as a rule in the past couple of years have not been having very regular pay days. Mining bilks and frauds have been coming and starting miners to work here, taking out a grind of several hundred dollars, putting it in their pockets and walking out of town. Similar reports come occasionally from other parts of the State, but altogether the amount of money lost by miners in this way in California is very small in proportion to the total paid out.

At the Sunshine mine in the Mercur district, according to the Salt Lake *Tribune*, it has been ascertained by the management that in the tailings remained about 17 per cent of moisture and that in this was contained an average of about $1. In order to save this loss preparations are being made to force this moisture from the mass by the application of air under pressure. The company has also decided that more effective and more profitable results may be obtained by applying the solution from below, and this is now being done.

The Boundary Creek, B. C., *Times* says: "There can be no doubt that had trade with our southern neighbors been less restricted in the past, the mining industry of British Columbia, and it is to the mining industry almost entirely that the province must depend for its future prosperity, had, we repeat, mining men from the other side received the encouragement commensurate with the energy and enterprise they have exhibited while operating in British Columbia, the mining industry would have been advanced by many stages beyond its present condition."

The Victor Mining Company of Colorado in its annual statement shows that the gross output of the mine for the year ending August 3rd, was 13,735 tons of ore, aggregating $435,183 in value, an average of $31.76 per ton. Of this amount 3073 tons of smelting ore averaged 6.18 ounces gold and 2.96 ounces silver per ton, and 10,662 tons of milling ore averaged 95 ounces of gold per ton. Twelve monthly dividends have been paid during the year of $20,000 each, and the company at the date of the statement had $48,213 in the treasury. The expense of the company during the year was $184,880 of which $121,159 was for wages.

W. C. Bruson has filed with the County Recorder of Shasta county locations of 60,000 miner's inches of water of the McCloud river, to be used for irrigating, mining, generating mechanical and electrical power in and about the iron deposits at the junction of the Pitt and McCloud rivers. It is proposed also that the water will also be used to supply the city of Redding. Charles E. Thurston also filed locations of a water right to 20,000 inches of the waters of the Sacramento river to be taken out of the stream at Pond island, to be used for irrigation, domestic purposes, generating electric power and to supply the city of Redding with water.

While the difficulty between the British and the Matabeles seems to be about over, the British leaders seem to be falling out among themselves. Between Cecil Rhodes and General Carrington there are disputes as to policy, and Colonel Baden-Powell has been ordered under arrest by Lord Rosmead, the high commissioner, pending an inquiry, for having confirmed the execution of the Matabele chief, Makoni. It is reported that at an indaba held with General Carrington, commander-in-chief of the imperial forces, and Cecil Rhodes by the Matoppo chiefs the latter agreed to quit the Matoppo hills and settle in the open country. Mr. Rhodes promised to assist them with seed corn.

The Denver *Republican* says: "The activity in California gold mining districts this year suggests that that State will greatly increase its output of the yellow metal compared with last year. Unfortunately, the same can not be said of Colorado. It is probable the product this year will not equal that of 1895. The decreased production of certain prominent Cripple Creek mines is largely to blame for this. It is all the more mortifying to the people because these mines are believed to be as rich in ore as they were last year. They could have been made to produce heavily. It is hoped that after the election renewed attention will be given to gold mining all over the State, whether McKinley is elected or whether Bryan wins."

A metallurgist gives through the Salt Lake *Tribune* a warning that it would be well for many California mine owners to heed: He says: "The miner who allows the slimes from his mill to go to waste in the face of recent inventions for the saving of their metallic values is over looking what might be a fortune in the bulk. I have visited nearly all of the camps in which mills are operated the present season, and except at Park City I saw no one who was making a pretense of saving them. I believe it a serious mistake. The system of handling and extracting the value of gold ore has been revolutionized since the introduction of the cyanide of potassium, but that is sometimes cheated and a loss is sustained through the slimes that with facilities now afforded should be easily recovered. They are doing it in South Africa; why not in Utah?"

The Leadville strike will probably soon be at an end. Monday morning at 1 o'clock an attempt was made to blow up the works at the Coronado mine. Much damage was done, several lives were lost and a reign of terror ensued. The Governor of Colorado has ordered the troops to Leadville. The trouble was caused by a lawless element, comparatively few in numbers, who have brought on the crisis. The strike began June 20th, when at 11 o'clock at night, the men in two or three of the leading mines walked out. The union scale of wages in Leadville was $3 for everybody; but in 1893, when the price of silver dropped below 60 cents an ounce, an agreement was made that $2.50 should be accepted for some classes of work until silver should return to 83 cents. This agreement, the miners afterward declared, was unfair, as many of the mines paid large dividends. It was to enforce the original scale of $3 that the men struck. About 3000 men were involved. Within the last two weeks several mines have resumed work and last week the output was 1200 tons daily, against 2000 tons before the strike.

The Boston *Transcript* of September 11th says: "Delinquent shareholders of the Merced Gold Mining Company, who have not paid the $2 assessment due June 18th last, received notice by mail this morning that if the assessment was not paid immediately their stock would be declared forfeited and the same advertised for sale." Commenting on this, the Mariposa *Gazette* says: "The stock of the company is listed on the Boston Stock Board among the unlisted securities. This is probably the outcome of the scheme to freeze out small stockholders. After the required notice, the stock of the delinquents will no doubt be sold and bought in most probably by those most interested, and in all probability a resumption of better times will follow for a while at the company's mines in Coulterville. The general public have had their faith shaken in the integrity of the company, and rightly so. The collapse of last summer was not the result of the failure of the property to meet expectations, but was the result of sharp practice and of stock schemes. The mines to day are as good as ever they were, and, with sufficient development, will so prove themselves."

The fall meeting of the American Institute of Mining Engineers began in Denver, Colorado, last Monday. Monday and Tuesday were passed in Denver with two sessions for business and the reading of papers and discussions and the usual opening business meeting. On Wednesday the members left Denver by special train, reaching Cripple Creek in the afternoon. The rest of Wednesday and all of Thursday were passed at Cripple Creek, where two sessions were held. On Friday a visit was paid to Colorado Springs, and from that place members went to Florence. To-day, after visiting the reduction works at Florence, they will be taken to Pueblo. On Monday morning the members will pay a visit to Central City, and from that place will go to Golden. The closing business session of the meeting will be held at the State School of Mines at Golden. Many papers and discussions have been submitted by members for this meeting, including articles by Charles W. Goodale, J. D. Pennock, C. P. Dewey, W. S. Grisley, Robert Gilman Brown, William P. Blake, Marcus R. Campbell, Carl Henrich, Joseph Hartshorne, J. A. Porter, H. Van F. Furman, Irving Hale, Arthur Lakes, Rossiter W. Raymond, W. M. Brewer, Frank C. Smith, Albert Sauvear, L. D. Godshall, Henry G. Granger and L. S. Austin.

The Nelson, B. C., *Tribune* advocates that all mining corporations doing business in British Columbia be required to incorporate under the laws of the Province. It says: "A great percentage of the mining companies operating in southern Kootenay are organized under the laws of the State of Washington, and with respect to several of them there is considerable uneasiness. Especially is this the case with respect to companies organized for development purposes, without any capital whatever save such as they raise through the sale of what is commonly called treasury stock. As matters stand, all that foreign companies have to do is to add the word 'foreign' after their title, register the memorandum of association and their head office, and commence doing business. In this Province aliens have the right to acquire and hold mineral claims, which cannot be done in the United States. It would therefore be no hardship if the Government required every company engaged in mining in this Province to incorporate under the laws of the Province." The legislature of 1884 passed an act providing, among other things, that where any advertisement, letter head, postal card, account or document issued, published or circulated by any corporation, association or company, or any officer, agent or employe of such corporation, association or company, purports to state the subscribed capital of the company, then the capital actually and in good faith subscribed, and no more, shall be so stated. Severe penalties are prescribed for violation of this law.

Percy F. Marks, in the London *Financial News*, speaks of the Cripple Creek district, which he has been visiting, as follows: "Neither does this fortunate individual stand in any need of capital in order to carry on his work. He wants no mill of his own, nor any expensive tram lines or any other appliances or machinery. There are at least two big public mills erected within a few miles of most of the mine shafts, while three or four purchasing agents attend at each claim daily, soliciting business. As many railroad touts are met with, all asking for the privilege of shipping the ore from the mine to the mills waiting to crush it. Add to this the number of representatives from various parts of the world who are bidding against one another to buy the mine right out, and it will not be difficult to picture the insolent air of independence which most of the mine owners assume. It is necessary to approach them, not only 'hat in hand,' but also upon bended knees. Even if their own knowledge did not tell them that they owned 'a soft thing,' the fact is being continuously drummed into their ears by the local press, which is necessarily proclaiming the astonishing value of Cripple Creek and extolling the prospects of the whole surrounding district. According to these Solons, there never has been such a gold field, and there never will be such another in the whole world. Furthermore, every endeavor is being made to shut out British capital and enterprise. Brother Jonathan does not mind sending us superfluous rubbish and wildcats, but when he does find a good thing he keeps it. And he appears to have found in the gold fields of Cripple Creek an uncommonly good thing."

An Advance in Gravel Mining.

(Continued from page 253.)

Feather the elevators are working in the river bed with most satisfactory results.

The service of the water in these cases, it will be observed, is large. The Risdon Iron and Locomotive Works of San Francisco are the manufacturers. In order to determine the size of machines and amount that may be handled, the following data must be given:

1. Quantity of water available for elevating purposes.
2. Hydrostatic head of water.
3. Distance to which material is to be elevated.
4. Largest size of gravel to be handled.

Gold Deposits in Nicaragua.

United States Consul Thomas O'Hara sends to the State Department some data on the gold deposits in Nicaragua, in which he says that along the Prinzapulca and some of its upper affluents rich placers have been found, several very small pockets having yielded from $3,000 to $20,000 each. The annual shipments of gold dust from the Prinzapulca region are generally estimated to have averaged $150,000 since 1888. At least two-thirds of the gold gathered in the district finds its way to Bluefields.

Many parts of northeastern Nicaragua remain unexplored. The greater part of the country is densely wooded and travel in most places is necessarily confined to the rivers. Many of the rivers are shallow and are filled with rapids.

An exploring expedition bound for the headwaters of either the Prinzapulca or Rio Grande, and gotten up to make an earnest and a systematic search for gold, should be supplied with sufficient flour, rice, beans, bacon, canned meats, lard and coffee to last from four to six months. The expedition should be properly manned, as there are many places at which the canoes and supplies must be dragged or carried long distances. Under the most favorable conditions as to season and weather explorers in northeastern Nicaragua must expect to experience uncommon exposures, fatigue and other hardships. It is a section in which inexperienced gold seekers are apt to become disheartened, and one in which veterans will find that health and hardihood do not make up for scarcity of store provisions.

Auriferous ores have been discovered near the heads of the Pis Pis, Banbana and Tunky rivers.

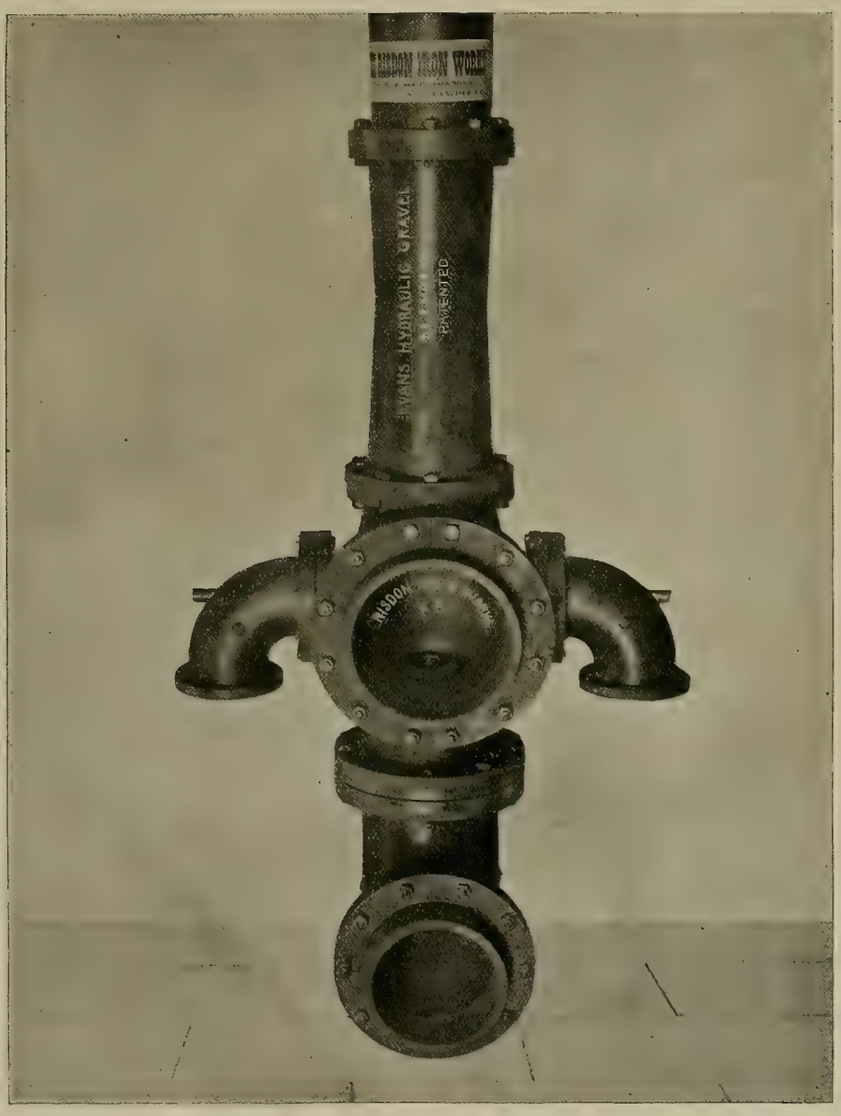
An article published in *Diario de Nicaragua* is quoted, in which it is said that Nicaragua possesses rich mines of gold, silver, copper, iron, zinc, opal, coal, gypsum, marble, white and brown limestone, alabaster, slate, alum, sulphur, saltpeter, etc. Besides the great but improperly developed mineral wealth of the mountainous regions, many parts of which, unfortunately, have not been explored, there is an abundance of auriferous ores in the districts of Nueva Segovia and Chontales. The greater part of the gold which is exported from Nicaragua is produced in these districts. The gold mines worked with the most proficiency are in the mining district of La Libertad, in Chontales, but even there much of the machinery used is of antiquated type. The ore in this district runs from 5 pennyweights to 2 ounces gold per ton, the gold being from 15 to 20 carats fine.

Mr. O'Hara tells of the formation of a company organized lately in Chicago with a capital of $1,000,000 to work mines on the Pis Pis river, where a 20-stamp mill has been erected. In conclusion, he says: "I do not advise people to either purchase mining stocks or rush to Nicaragua in search of gold, but I believe that a live agent might be able to sell considerable mining machinery and supplies in the country."

Improved Processes for Reducing and Saving Precious Metals.

By ALFRED VON DER ROPP, Superintendent of Selby Smelting and Lead Company.

It often happens to us who are engaged in helping to produce the precious metals, that men pursuing other vocations ask the question why there is such a marked difference in the cost of producing the precious metals now as compared with earlier methods; why mines that years ago were abandoned are worked once more and begin to pay dividends, and often handsome ones, where before they proved a source of losses. The natural answer is, mining in all its different branches is less expensive to-day than it used to be, and the skill of the mining men, as well as of the metallurgist, has kept pace with the times and this to such a degree that American, and especially California, mining engineers and metallurgists are to-day engaged at large salaries to go to foreign lands to develop mines, erect and operate reduction works of all kinds and introduce new and effective machinery.



EVANS HYDRAULIC GRAVEL ELEVATOR.

To quote just a few instances where American skill has taken the lead in foreign countries, let me recall that the largest lead-silver producer in the world to-day—the Broken Hill Proprietary Co. of New South Wales, Australia,—was mainly developed by Nevada and Colorado talent. The Mount Lyall Co. of Tasmania is practically under the management of American engineers. The diamond mines in South Africa have a Californian as manager, and the Transvaal gold fields were and are now in the hands of men whose names are known to all of us on this coast—in fact, so many able engineers have made the Transvaal their homes in the last few years that it looked for a while as if we would be short of talent to develop our own resources. Only recently another California engineer has been engaged at a princely salary to examine into the mineral wealth of Siberia, which country no doubt will soon call on us to furnish more talent and plenty of machinery.

As to the means of reducing the precious metals from the ores mined in our Western States, and particularly in California, there has been such a change that thousands of tons that were allowed to go to waste in the earlier days are now considered well worth saving. I refer especially to the sulphurets in the ores. It is well known, of course, that many of the ores produced here in California—and I speak now of gold ores—contain more or less of the sulphides of the base metals, which in their turn often contain gold which will not amalgamate directly. In other words, the gold in these ores is only partly free milling. In earlier days these sulphides were allowed to remain in the tailings and run to waste. The new concentrating machinery of to-day saves these sulphurets and turns them over to special processes whose duty it is to extract the gold from this refractory material and thus often enables a mine to pay handsome dividends, which, under the old regime, would have been operated at a dead loss.

The processes by which the gold is extracted from these sulphurets may be classified as follows:

I. The wet processes.
II. The fire process.

The wet processes are:

1. Chlorination,
2. Bromination,
3. The Cyanide Process.

All of these give good results if properly applied, but I shall confine myself to the fire process with which, I think, the public is less familiar. The fire process of extracting the gold from the concentrates or sulphurets is based on the following simple reactions:

The gold will be absorbed by metallic lead or copper sulphide, ordinarily called matte, if both the gold-carrying material as well as one of these two media named are brought in contact in a molten state; or, to use a chemical term, the affinity of the gold in the ores or concentrates is more intense for metallic lead or copper matte than for the metals with which nature had associated it.

In smelting the raw material with one of the two above-named media, we have, generally speaking, two products, namely, slag and lead bullion, which latter has absorbed the gold or silver from the ores, or slag and a copper matte which has combined with the gold.

Which of these two processes is to be used depends on local conditions and is largely a business question. The process of allowing the gold in the raw material to accumulate in metallic lead is the one more generally used, while the separation of the gold from the ores by means of a copper matte has only recently been introduced on this coast.

This latter process is the one that has enabled the miner to sell his base or refractory ores and his concentrates to better advantage than was the case only about a year ago, and this process, I dare say, will consequently be of more interest to the miner than the older reduction methods. To describe this process, in which copper matte plays the roll of accumulator or separator of gold from base ore or concentrates, as the case might be, it will be necessary to describe roughly the character of the raw material to be treated.

The ores are, as a rule, composed of silica or quartz, with more or less of the sulphides of iron, copper and sometimes zinc. The sulphurets are of the same composition qualitatively, while they differ from the ores in their quantitative makeup. In other words, the sulphurets, being a product of the concentrating mills, will contain more of the heavy or base sulphides than the original ore did. As it is essential in the fire process that the material to be smelted should contain its own flux, this quality of the sulphurets, namely, that they contain iron in large quantities, makes them especially desirable to the smelting works. But, on the other hand, the sulphurets contain large quantities of sulphur which have to be eliminated to some extent before the smelting process proper can begin, because the iron is only available as a flux when in an oxidized state. To transform the sulphide of iron into an oxide the raw material has to undergo the so-called roasting process, in which the largest part of the sulphur is oxidized or burned off, leaving the iron as an oxide.

In this roasting process, especially, we find im-

provements that have very much transformed and enlarged the old style smelting works. We used to roast the ores in the so-called hand reverberatory furnaces, where the ore was stirred and moved ahead by men—a hard and unsatisfactory method of roasting, running the cost of treatment up to forbidding figures. To-day there are many types of furnaces that do all this work by steam. The ore is fed into the roaster by machinery. Machinery accomplishes the stirring and moving of the ore, and the finished product is discharged by the same machinery into cars, ready to be dumped into smelting furnace proper. Not alone has the cost of roasting been reduced to about one-eighth of what it used to cost in the old hand reverberatories, but the end product is more uniform, as it does not require skilled labor when steam does the work, and we all know that steam is a pretty reliable partner as long as the fireman is not asleep. Besides, the first cost of erecting a modern roasting plant for a given tonnage is far less than it used to be before mechanical furnaces were in use.

We have now our concentrates, after passing through the roasting furnace, in proper shape to deliver them to the smelting furnace, where the separation or better accumulation of the gold and silver in a copper matte is to take place. The furnace in which the roasted concentrates are to be smelted is usually of the reverberatory type, or, to describe the same in a few words, the furnace consists of the hearth, the walls and the arch or roof.

The hearth consists of an inverted arch, built up of nine-inch firebrick; the walls are usually of firebrick, as is also the roof or arch. This latter is so constructed that the heat striking it will be thrown back or reverberated on the charge. An innovation has been made at the Selby Smelting Works in replacing the firebrick of the walls, to a certain height above the hearth, by lumps of chrome iron. This is a very refractory material and was used in Russia and France to line the furnaces for the basic steel process, in which it was found to be of better service than any firebrick on the market. The writer tried this chrome-iron lining in the copper matting furnace at Selby, and will stick to it as long as there is chrome iron in sight, as the life of the furnace is more than doubled by it.

The ore from the roasting furnaces is dumped hot into hoppers above the smelting furnace, and when a charge is needed the slides are opened and the ore is dropped on the hearth of the reverberatory furnace, where it begins to melt down in a short time.

As soon as all of the charge on the hearth is melted, the slag is allowed to run out of the furnace and to fill a row of sand moulds, each holding from 1000 to 2000 pounds of slag. After cooling, this slag is lifted from its sand bed by a grapple iron attached to a crane and loaded on cars, from which it is dumped on the waste pile. The matte, being of a heavier specific gravity than the slag, collects naturally at the deepest place of the hearth, from where it is tapped through a special opening into iron moulds. As soon as this is done a new charge is dropped into the furnace and the process of smelting goes on again.

The matte formed contains now the gold and silver originally in the ores and is mainly composed of copper and iron sulphides. This product has to undergo another process to liberate the precious metals, and there are two ways to accomplish it:

I. By the electric refining of the copper, leaving the silver and gold as a residue to be refined by themselves, or

II. By turning the matte over to the lead blast furnaces, where the iron of the matte acts as a flux and the lead combines with the gold and silver. The product thus obtained is called base bullion, being composed of lead, silver and gold, and has to undergo the process of separation and refining, of which I shall not speak here in detail.

Here in California, and especially at the Selby Smelting Works, another agent comes into play to allow low-grade refractory ores to be smelted successfully, namely, the fuel used in both the roasting as well as the smelting furnace. Since about six months ago we have been using crude oil from Ventura in both furnaces and the results are very satisfactory ones, in a technical sense, as it is essential to maintain, if possible, an oxidizing atmosphere in both the roasting and the smelting furnace. This oxidizing atmosphere can be steadily maintained by the use of oil or gas, but not so when using coal as fuel.

I have tried to keep the technical expressions out of this paper as much as possible, and hope I have been able to show at least some of the new ways and means by which gold mining in the present is made profitable, where it used to be a losing proposition; and, no doubt, every year will see new methods and new machinery come to the front to help us produce and reduce as fine metals the silver and gold of the more refractory and low-grade ores, at a cost acceptable to the miner as well as to the metallurgist.

It is proposed to sink a shaft at the Paris Exposition of 1900 to a depth of one mile. The Red Jacket shaft at Calumet, Michigan, is already down 4900 feet, and on the Rand in South Africa a number of shafts will doubtless reach over a mile by 1900.

Gold Mining in California.

By ARC. J. BOWIE, Mining Engineer.

Our gold mines have added $1,265,217,764* to the wealth of the world, and it was principally owing to their yield that the Government was able, at the time of the civil war, to maintain its credit and, later on, to resume specie payment.

The gold fields of California attracted the attention of the world, and to their production was due the prosperity of the people of this State.

The valleys of California, at one time considered hopelessly barren, were at first cultivated to supply home consumption, and, owing to the flourishing condition of the mining regions, everything produced brought a high price.

With development, the fertile nature of the soil was discovered, and there followed an era of agricultural prosperity which attained its height towards the end of the '70s, and declined as Chili, Argentine Confederation, Russia and India began to compete with us in the production of cereals.

Meantime great land speculations were entered into by shrewd individuals, who concealed their identity under the guise of corporations and did their work through lawyers and politicians, with the result that, to benefit themselves, they succeeded in persuading the then predominant farming element to involve itself in litigation with the miners.

Some idea of the extent of their speculations can be gleaned from the fact that, between 1880 and 1890, the valuation of farming lands increased, with absolutely no reason, over $435,000,000, or 160 per cent. During the interval the increase of population was insignificant, the grain business decreasing in value, and, owing to litigation, the products from the gold fields annually diminishing.

Hydraulic Mining.—It is estimated that in the hydraulic interest alone over $100,000,000 therein invested were affected by the decision of the United States Circuit Court of this State. Strange though it may appear, it was discovered that the hydraulic miner had no legal status in court. In a country made by him he was simply an outlaw, and it was only to the action of the Legislature of 1892 that sections 1424 and 1425 were added to the code, placing hydraulic mining among the legitimate industries of the State. Miners from California, driven out by the closing of mining operations, directly and indirectly affecting all interests, are found to-day in all parts of the world, whereas our mineral resources, if we were permitted to develop them, would give them ample occupation at home, and afford employment for millions of capital. However, before this condition can exist, there must be perfect security for investment, and, without it, there can never be perfect prosperity; or, in the words of Macaulay, "public prosperity could only be restored by the restoration of private prosperity, and private prosperity could be restored only by years of peace and security."

Legitimate and Speculative Mining.—In dealing with mines a distinction must be made between legitimate and speculative mining. By legitimate mining is understood the purchase of properties developed, with ore in sight and estimated to give a stated net monthly output from the working of a definite number of tons per diem, with a stated yield per ton at a given cost, the price paid for the property being determined by the value of the ore in sight, calculated to return a given monthly percentage on a specified capital. Few of the prominent dividend-paying gold mines of California in former days were listed on the Stock Exchange. The owners quietly worked them and were satisfied with their production. This is especially true of the most prominent mines, such as the old Hayward mine in Amador county, near Sutter Creek; the Keystone mine, near Amador City; the celebrated Sierra Buttes mine in Sierra county; the Plumas-Eureka; the Eureka mine at Grass Valley; the Idaho and Maryland mines of Grass Valley; the Black Bear of Siskiyou, and numerous others which could be mentioned. During the latter days of the working of several of these mines the stock of some of the companies was listed and a speculative value was given to it over and above what was considered legitimate by the interest then paid on the investment. The stock operator was, as a rule, but little tempted by such securities, and the daily variations were not sufficiently large, and the quantity of stock offering too limited, to permit of any large amount of money being made in daily transactions, particularly during the palmy days of mining excitement in Pioche and on the Comstock, when fortunes were sometimes made in a very few days, and, as may be truly added, were lost with even greater rapidity.

Speculative Mines.—What is understood by mining speculation in gold quartz properties is the purchase from prospectors or owners of what they state to be the location of a valuable ledge or deposit, necessarily containing gold, whether in paying quantities or not. It is supposed that such ledges or deposits exist and it is hoped that no one with experience would take up such an enterprise without positive knowledge of their existence. The precaution of making investigation to this end is very essential, as could be proven by capitalists to whom so-called mining claims have been offered, which were subsequently found to exist only on paper. These cases are naturally exceptional, but when competent men report the exact facts and the indications warrant an investigation, the full status of affairs being known, the speculation becomes legitimate and the extent to which any man invests must be at his own risk and regulated by his own judgment.

Mining as a Business Proposition.—Mining reduced to a business proposition and given due attention, involves no greater risks than any other legitimate business. The life of a mine is limited, but the purchaser protects himself by the developments of the enterprise and the rate of interest on the capital invested demanded from it, and, at the same time, following the progress of the prospecting. The additional speculative value given to a property by the progress of the different developments in the lower levels, is simply an anticipation of what is expected will be developed. The speculation is a matter of judgment, not only as regards the development itself, but as regards the public pulse and the ability of the operator to stand the financial consequences. Similar transactions in real estate take place every day in all the markets of the world.

An Outline of the Topography and Geology of California.—The topographical features of central California are exceedingly simple. Four equi-distant parallel lines can be used in conveying a general idea of the physical geography of the State.

A main axial line whose course would be N. 31 W., passing through the culminating peaks of the Sierra Nevada for a distance of nearly 500 miles, can be assumed as the eastern boundary of the gold region.

A second parallel drawn fifty miles west of the main axial line will skirt the west base of the Sierra Nevada along the foothills from Red Bluff to Visalia.

A third parallel line equi-distant from the second will follow very closely the eastern edge of the Coast Range from the neighborhood of Clear lake to that of Kern lake, a distance of over 300 miles.

A fourth equi-distant parallel will represent as nearly as possible the coast line of the Pacific, the western base of the coast ranges.

These parallels divide the central portion of the State between Red Bluff (about latitude 40° north) and Fort Tejon (about latitude 35° north) into three belts, namely, the Sierra, the great valley of California, and the coast ranges.

This arrangement of physical features holds good for a length of about 400 miles in the direction of the main axial line.

This division of California is the largest and by far the most important, embracing the whole of the agricultural and most of the mining districts.

These lines divide the State geologically as well as physically.

The great valley is the belt of recent alluvial deposits; the Sierra is the belt of intrusive granite, of strata of Triassic and Jurassic age, with important Pliocene river deposits of ante-Cretaceous elevation and of the metamorphism induced by heat and pressure and resulting in a hard and crystalline condition of the rocks; the coast ranges from the strata chiefly of Cretaceous and Tertiary age, of post-Cretaceous elevation and of chemical metamorphism.

The Sierra is the belt of the precious metals, with some iron and copper; the coast ranges are principally of quicksilver and carbonaceous material. The Sierra is the region of lofty heights, the coast ranges of moderate elevation, and the great valley of nearly dead level.

In the Sierra volcanic activity has nearly ceased, but in the coast ranges solfataric action is still apparent.

The Topographical Structure.—The Sierra Nevada is a well-defined range of mountains, situated on the ledge of a high plateau, its eastern base being about 4000 feet high, while its western side (broken by steep canyons) slopes nearly to the sea level.

The general elevation of the range in the northern part of the State may be assumed to be 7000 or 8000 feet. Mt. Shasta, the highest point of this section, rises to a height of 14,440 feet, dominating all the others. South from Lassen's peak to near Tejon Pass, the Sierra Nevada forms a clearly defined crest, gradually increasing toward the south.

Along the headwaters of the Feather river the elevation of the prominent peaks is about 9000 feet and the passes 5000 to 6000 feet. Lassen's Peak rises 10,500 feet above the sea level.

Around the headwaters of the American river the main crest is a little over 9000 feet high and the passes 7000 to 8900 feet.

At the headwaters of the Merced and Tuolumne the main peaks are 12,000 to 13,000 feet high and the passes 9000 to 10,000 feet.

In the region of the headwaters of the Kern, Kings and San Joaquin rivers the main crest is 12,000 to 13,000 feet, with numerous points exceeding 14,000 feet high, Mt. Whitney being the culminating peak.

General Geological Structure.—The Sierra Nevada is made up of (1st) a central intrusive core of granite,

*Corrected and U. S. Mint Rep. ending Dec. 31, '95.

flanked by (2nd) metamorphic slates of Triassic and Jurassic age (the so-called auriferous slate formation) over which lies (3rd) a covering of Cretaceous Tertiary and post-Tertiary deposits, which are either (*a*) the river deposits which form the material which is washed, either by hydraulic or drift process, or to extract the gold contained therein; or, (*b*) sedementary volcanic layers; or, (*c*) lava; or, finally, in some places, (*d*) marine formations.

Granite.—The granite occurs in the extreme northwestern part of the State, disappearing in the northeastern under the extensive lava beds, reappearing in Butte and Plumas counties, and continuing to increase in amount of exposure toward the south, until, in Fresno and Tulare counties, it forms territorially by far the greater part of the belt, extending from the crest almost down to the plain.

Auriferous Slate Formation.—The auriferous slate formation, consisting chiefly of metamorphic, crystaline argillaceous, chloritic and talcose slate, appears with, but subordinate to, the granite in the northwest. It appears again in Plumas and Butte counties, increases in importance as the overlying lava decreases. North of the American river it occupies nearly the whole width of the western slope of the Sierra, with occasional areas of granite enclosed in it. Going south, it gradually contracts in width, being of but little importance south of Mariposa county. In the extreme south of the junction of the Sierra and the Coast ranges it reappears and continues in San Bernardino and San Diego counties in connection with the granite. The strata of this formation is elevated very considerably, often in a nearly vertical position. Speaking in very general terms, it may be said that the strike of the slates is usually parallel with the axis of the range, and the dip of the southern portion of the belt is generally to the east.

Gold Quartz Veins.—In this formation occur almost exclusively the veins of quartz which carry gold in amounts which pay for working. While such veins occur also in the granite and likewise, as has been mentioned, in some of the Coast Range formations, the paying gold quartz is rarely found outside of the auriferous slate formation. Some of these veins are of very great size, notably the great quartz vein which has been traced from the center of Amador county through Calaveras and Tuolumne into Mariposa to the Mariposa estate, a distance of 80 miles. The vein obtains a width in places of several hundred feet.

The mother lode is an auriferous belt whose strike is N.W. and S.E. The "lode" dips eastward at an angle of from 45° to 70° to the horizon. The hanging wall is greenstone and the foot wall is slate.

Professor Whitney, in speaking of it, says: "It is not by any means a continuous bed, or vein, of quartz, but, rather, a series of nearly parallel belts of lenticular masses with barren intervals between them, but yet arranged nearly on the same course."

The geological maps of California note the location of gold deposits from the Colorado river on the south to the dividing line of Oregon on the north, a distance approximating 800 miles. This great length of territory, extending along the western slope of the Sierra Nevada, is covered with vast auriferous deposits and dotted with numerous quartz veins from one end of the State to the other. St. Julian district in San Diego county, on the edge of the desert, has given us two mines—the Golden Chariot and the Stonewall Jackson—which have produced several thousand tons of some of the highest average-grade gold quartz found in the State. Sierra, Plumas, Nevada, Amador, Sutter, Mariposa, Tuolumne, Calaveras, Shasta, Siskiyou and Trinity counties have made the State famous by their yield of placer and quartz deposits.

Depth in California Gold Mines.—The greatest depth attained by a gold mine in California is 2400 feet.* The Hayward mine, in Amador county, when closed down after the fire, had reached a vertical depth approximating 1900 feet in the Eureka shaft, at which point the ledge was said to have been fully as strong and rich as it was on the 800 level, down to the 1300, where it averaged from $14 to $20 per ton in the mill. In its early history the rock from the surface of the 600-foot level is said to have varied from $6 to $8 per ton and did not pay the cost of extraction. The Kennedy mine, in Amador county, was worked for years and years, hardly making both ends meet, until the 1300 level was cut, and from that time on to the present date the mine has steadily paid dividends, and has reached a depth of 2100 feet,† or 400 feet below sea level, at which point a level is now being opened, and a crossdrift will be driven to meet the bonanza now being worked on the upper level. Eastern and European capital is at present being expended in sinking a shaft at the Oneida mine, which is situated between the Kennedy on the south and the Hayward mine on the north, the intention being to cut the vein on the 1800 level below the collar of the shaft, then unwater the old mine and develop it in depth. The developments in Nevada county have all tended to show the continuity of the principal quartz veins in depth, and, likewise, the continuation of pay ore. The same may be said of the mines in Tuolumne county, where the Rawhide mine is now working on the 1000-foot level, and in mines in different places throughout the State.

Gold Quartz Deposits.—It may be proper to explain how these gold deposits, or gold quartz veins, occur. As a general proposition, the gold quartz bodies of California are found in veins. A vein simply means a fissure; in other words, it is a crack in the earth's surface, into which the quartz or other material has been injected or deposited by natural causes. Veins are divided into four classes: true veins, contact, bedded and lenticular veins. These segregations simply indicate their mode of occurrence. A true vein is supposed to be a fissure of deep-seated origin, which traverses a rock or formation independent of its texture and position, not parallel to its stratification or foliation. A contact vein occurs between two different formations. A bedded vein is a deposit which occurs between the lamina or layers of a formation necessarily parallel with it, like a coal bed, for which it could be mistaken were it not for its fissure nature. Lenticular veins thin out in all directions, are in part only local expansions of really continuous fissures, in part, on the contrary, lentiform secretions, and are not then properly veins. There are numerous other subdivisions of ore deposits, which it is here unnecessary to mention.

The Strike.—Every vein runs in some general direction. This general direction or course in a horizontal direction is known as the strike, and the inclination or angle which the vein takes from a horizontal plane on the surface of the ground is called its dip. The quartz or material bearing the gold fills the fissures, but it must not be supposed for an instant that the fissures are of even width in length or depth. Irregularities in the contraction of the fissure are liable to occur from natural agencies which produce contractions, twists and bends, caused by lateral and end pressure under a superincumbent weight and assisted at times by slips of either the foot or hanging wall, or of both, or of cross fissures or dikes intruding, which may produce throws.

It is therefore evident that a miner when once underground is liable to encounter a great many obstacles which cannot be foreseen. It is an accepted fact by those who have studied the question of mineral deposits, that the walls of a vein, the peculiar location of the deposit in the fissure, and the presence of cross veins, have more or less influence in the enrichment or impoverishment of the deposit itself.

It has already been stated that the fissures are irregular, and it may likewise be added that the gold-bearing material which fills the fissure is irregular in its thickness as well as in its contents. The pay bodies themselves take definite positions and follow a given pitch in the vein on the strike. The entire filling of a fissure is not necessarily ore, the pay ore occurring in independent bodies in the vein which are called ore chutes. The inclination which these bodies assume is called the pitch of the chute. Hence, it is not unusual to see a chute of ore pass from one claim into another, leaving the mine where it was originally encountered—that is to say, passing beyond its end line. This has been illustrated in a remarkably clear manner in the case of the Eureka mine of Grass Valley, where the pay chute passed successively into the Idaho and Maryland mines. The same chute is being worked to-day in the Maryland at a depth of 2000 feet.

Ore Chutes.—There is no limit to the length or number of chutes which may exist in a vein in any mine. There may be chutes from 50 to 100 or 1000 feet or more in length and in a location of 1500 feet. Generally, several chutes are encountered, the intervening spaces being filled with selvage or vein matter. The miner, however, in working, should note with care all the peculiarities of the deposit so as to enable him to follow up intelligently its exploration at lower levels. As long as the precious metal continues to exist in the deposit, so long must a miner have hope. According to the old adage, no hope, no miner. But, when the ore gives out, there is no known law which can tell when or where to find it.

Mine Development.—Having now described the general appearance of quartz deposits, it seems almost unnecessary to discuss the opening or development of a mine with California readers. In brief it may be stated that according to the location, a mine has to be opened by either tunnels or shafts as the case may demand, levels run at stated intervals of 100 feet to 120 feet, winzes sunk as required and the ground opened up for the extraction of ore. The size of the works depends on the development, that is to say, upon the value and productive capacity of the deposits. But one word should be added.

Let all developments be made on the vein. Any work done outside of it is so much money thrown away. Follow the vein wherever it goes and study its nature. Of course, there are instances and circumstances where vertical shafts are advisable, but never in undeveloped properties or in newly discovered districts. We have now in a cursory way looked over the question of quartz deposits.

(*To be Continued.*)

*On dip of the vein. †Vertical.

The Cyanide Process at the Utica Mine.

By THOMAS N. SMITH, Superintendent of the Chlorination Works.

The cyanide process as used at the Utica Mining Company's plant at Angels Camp is limited in its application to the smallest product from the mills, viz., the slimes saved at the canvas plant. The treatment of these is satisfactory, for we get 85% of the gold assay value at a cost of $3.50 per ton of 2000 pounds of ore treated. The plant consists of:

One agitator or pan.
One filter press for ore.
One vacuum pump.
One solution pump.
Two storage tanks, for solution.
Two zinc filters.
One tank or sump for solution.
One filter press for bullion.

A description of these will be found in Bulletin No. 5 of the State Mining Bureau.

We work as follows: The solution made up of 1600 pounds of water, in which 10 pounds of pure cyanide have been dissolved, is run into the agitator and the paddles started. The ore, weighing 4000 pounds, is then added and stirred for six hours, when the extraction is complete. It is then run into the filter press, where the solution is suched out of the ore by means of the vacuum pump. By repeated washings all of the gold and silver in solution is taken out.

This part of the process is hastened by turning the ore over to a depth of 2 inches and prodding it constantly for two hours with a square-pointed shovel after the solution is sucked below the surface. The solution used for washing is taken from the sump and is not more than enough to cover the ore 1 inch in the filter press. The solution is then run into the storage tanks. From these it passes in a small stream into the zinc boxes, upward through the zinc shavings and into the sump, freed of its gold and silver. When the time arrives for cleaning up we take the zinc shavings, together with the precipitated gold and silver, and separate the precipitate from the zinc shavings by washing with water. The shavings are put back into the boxes. The gold and silver precipitate is treated with dilute sulphuric acid, washed with water, thoroughly dried, and finally melted with borax. Our last bar was .983 fine—.783 gold, .196 silver. The plant was started July 23rd, 1893. Since then it has treated:

NAME OF ORE.	Dry Tons.	Value Per Ton.	Total Value.	Amount Realized.
Utica Canvas Plant..	$665\frac{1369}{2000}$	$44.74	$29,782.72	$25,315.31, or 85%
C. G. Betts.....	$67\frac{1397}{2000}$	41.82	2,831.15	2,406.47, or 85%
Con. Eureka	$116\frac{1347}{2000}$	36.16	4,218.91	2,025.07, or 48%
Utica Concentrates..	$8\frac{1250}{2000}$	70.14	254.26	122.04, or 48%

From the above statement it will be seen that the process shows good results with certain ores, as the fine slimes from the canvas plant at the Utica mine, from which 85% of the gold is extracted. This material is especially fitted for cyanide treatment, being composed of 80% carbonate of lime and 20% pure iron sulphurets, all of which will pass through a No. 150 mesh sieve without grinding.

With certain ores with which we have experimented the sulphurets from the Black Oak mine, Tuolumne county, for example, in which the silver predominates, an extraction of 90% of the gold and 90% of the silver can be obtained at a cost of $3.50 per ton.

With an ore from Nevada, which contained 2 ounces of gold and 170 ounces of silver, we treated 5460 pounds and extracted with cyanide 90% of the gold and 50% of the silver. We then roasted the ore and extracted 90% of the silver remaining by leaching with hyposulphite of soda. The cost of treatment was $10 per ton. By this it will be seen that cyanide has advantages as an aid to chlorination. This ore was the finest ore we have ever treated, and the most of the value was in the powder in the ore. On account of this fine powder it would have been difficult to treat by any other process and in any other way.

By reference to the statement of ores treated it will be noticed that the Con. Eureka coarse concentrates and the Utica coarse concentrates (two tons of the Utica concentrates were roasted) were not treated successfully, an extraction of 48% only being obtained. Such a poor extraction was attributed to two causes: First, to the coarseness of the sulphurets; second, to the sulphurets coming in contact with quicksilver in the batteries. If the sulphurets were saved and treated with cyanide before quicksilver was added a much better per cent would be obtained. The most favorable results can be expected from the treatment of sulphurets with cyanide when the sulphurets are very fine and the gold is fine and free.

To be able to tell whether sulphurets can be treated successfully by cyanide or not, they must first be subjected to practical tests, either with a small quantity or a large one. If these are satisfactory, and the ore remains the same, one can always be sure of getting the same results. There is no difficulty in getting the gold after it is once in solu-

tion; for zinc shavings act perfectly when used in sufficient quantity.

Cyanide has but one disadvantage. It does not, as a rule, dissolve enough of the gold and silver in an ore to make it preferable to chlorination.

A comparison of results, after experimenting with sulphurets, will show whether cyanide or chlorination is wanted.

Scientific Progress.

The Utility of Inventions.

It is no doubt true that when a new invention is introduced which revolutionizes some particular art or branch of business it at first decreases the number of persons employed in that particular line; but that is only temporary, for in a short time the result is a cheapening of the product, a greatly increased demand for it, because of this cheapening, and then necessarily an increased demand for laborers in that line, and almost universally at increased wages. The statistics show this to be true beyond the possibility of a question. The records of the Labor Bureau of the United States show that, from 1860 to 1880, the most prolific period of inventions, and the most intensified in all directions of their introduction, the population increased 59.51 per cent, while in the same period the number of persons employed in all occupations—manufacturing, agriculture, domestic service and everything—increased 109.87 per cent; and in the decade from 1870 to 1880 the population increased 30.08 per cent, while the number of persons employed increased 30 per cent. As shown by the investigation of a committee of the United States Senate, wages have increased 61 per cent in the United States since 1860. And, as we all know, during that same period the cost to the people of nearly all manufactured articles has been decreased in as great, if not a greater, ratio.—Canadian Journal of Fabrics.

By the use of the electric furnace, M. Moissan has been able to prepare the metals whose oxides have been looked upon as irreducible by carbon, says London *Engineering*. He obtained uranium in this way three years ago, and in a recent number of the *Comptes Rendus* he gives a complete account of its preparation and its properties. It is isolated in three ways: by the action of sodium at a red heat upon the double chloride of sodium and uranium, by electrolysis of this double salt in the fused state, and from the oxide by reduction with carbon in the electric furnace. The last process gives the best yields if the heating in contact with carbon is not unduly prolonged and if air is excluded. Metallic uranium, when pure, is perfectly white, and is not magnetic if free from iron. It is not hard enough to scratch glass, takes a good polish, and can be filed with ease. It is much more volatile than iron in the electric forge. M. Henri Becquerel, in the same number of the *Comptes Rendus*, tells of a remarkable and probably unique property of this metal—that of emitting invisible phosphorescent rays capable of producing photographic effects after traversing opaque bodies such as cardboard, aluminum, copper and platinum, and also able to discharge a gold-leaf electroscope. The effects produced are precisely similar to those obtained from uranium salt, except that they are nearly four times as intense.

That the manufacture of hard steels may be attended with a bi-product in the shape of diamonds, is a consideration which has not yet been reduced to any practical element, and one that may cause some surprise. Several years ago M. Moissan proved that when iron was saturated with carbon at a temperature of 3000 C., and afterwards cooled under heavy pressure, a portion of the carbon separated out in the form of minute crystals, which were found to be true diamonds. In the *Comptes Rendus* it is stated that it occurred to M. Rossel that the conditions under which very hard steels are now made should result in the formation of diamonds. He examined a large number of the steels now made, and found that his theory was supplemented by fact. The diamonds are obtained by dissolving the metal and then submitting the residue to the influence of concentrated nitric acid, fused potassium chlorate, hydrofluoric and sulphuric acids respectively. The diamonds obtained are almost microscopic in their dimensions, it is true, but they present all the physical and chemical properties which distinguish the true gem.—American Manufacturer.

At the late meeting of the American Association for the Advancement of Sciences at Buffalo, N. Y., over which Prof. Joseph Le Conte of the University of California presided, two papers on the geology of California were read by Prof. J. P. Smith of Leland Stanford University. He proved the close parallelism with the beds of Europe by the terraces of the Triassic and Jurassic eras. He described the physiography of the region, and discussed the origin and growth of the mountain ranges, illustrating his remarks by aid of the stereopticon. The main orographic movements were in the Cretaceous and Tertiary periods. He explained the Tertiary and Post-tertiary erosion and the uplifts of the Coast Range and the Sierra Nevada. He said that the great valley of California was never an arm of the sea, being full of river deposits. He traced out the ancient river systems, and spoke of recent geologic changes.

Among the many objects discovered lately by W. Flinders Petrie and others, while excavating some 30 miles from Thebes, and now on view at University College, London, there is a pair of scales, which, with the exception that they turn on a pin, exactly resemble those used in our pharmacies of to-day. The length of the beam is about 4½ inches, a ring at each end carries the original cords, which are three in number, and the pans, about the size of a penny piece, are slightly convex in shape; a small ring is attached to the top, by which they may be held; the finish and workmanship are alike excellent.

There will be held in New York, at Madison Square Gardens, in January, a gas exposition for the purpose of bringing together a collection of gas apparatus and appliances of every description, for the two-fold purpose of affording the general public and the gas engineer an opportunity to study the developments that have taken place in the gas industry during recent years. The cooking demonstrations will be a feature of the exhibition.

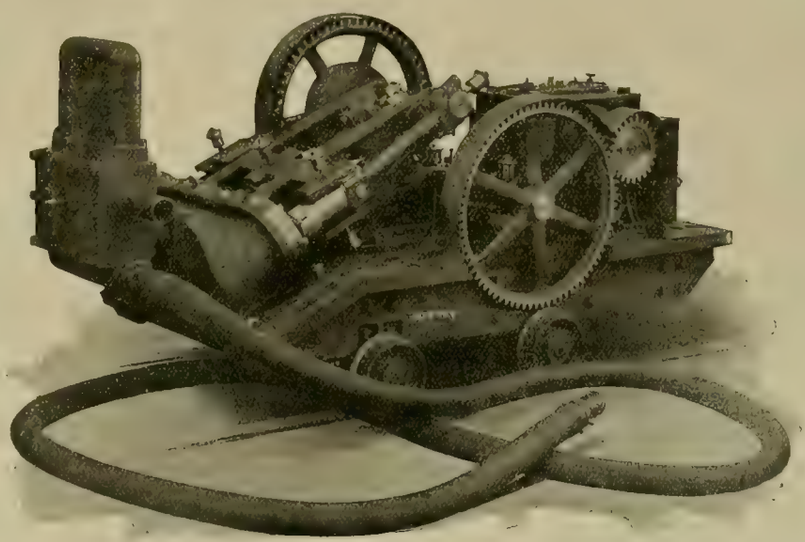
Aconcagua, the highest peak on the Western Hemisphere, is to be attempted again this fall by E. A. Fitzgerald, who explored the New Zealand Alps. If he succeeds in getting to the top, which is 23,200 feet above sea level, he will beat the highest mountain-climbing record, Sir W. M. Conway's 22,600 feet ascent of Pioneer Peak in the Himalayas. Dr. Gussfeldt has tried Aconcagua, but got into trouble with his guides and had to turn back 2000 feet from the summit.

Mechanical Progress.

The Jeffrey Mine Pump.

The pump illustrated herewith is a Jeffrey triplex mounted pump, especially designed for use in coal mines. It is operated by a ten-horse power waterproof motor, and has a pumping capacity of sixty gallons of water per minute against a head of 300 feet. The diameter of the cylinder is four inches, stroke six inches. The entire water end, plungers, valves, glands, etc., in fact, all parts which come in contact with the mine water, are made of composition metal. The pump is readily moved about the mines, which makes it possible to drain a large area.

It is of the type known as track-running dip pump, being of the triplex, single-acting plunger type, a construction that has been found best adapted for working in connection with electric motors, as it brings the most uniform load on the motor. The plungers are made of bronze and outside packed, the cylinders are all bronze-lined and the valves and all parts of the pump coming in contact with the water are made of bronze. This is considered absolutely necessary in a mine pump where the action of the water is so injurious as it is in mines. The principal advantage of this form of pump is that it can be taken from one portion of the mine to another for pumping out local sumps or dips. The suction end has a screened rubber hose attached to it, which is placed in the water to be pumped out. The discharge is connected either by means of long lengths of hose or straight connections to the main line of water piping. In other words, this pump simply takes the place of two or three men, mules and water carts which have in the past been used for taking the water out of these local sumps where it would not pay to pipe for steam and place a permanent pumping installation. Operators using these pumps say that it means a saving of from $6 to $8 per day.



THE JEFFREY MINE PUMP.

In a mine having an output of 500 tons per day, this is figured out as a saving of one and three-fifths cents per ton.

The Jeffrey Manufacturing Company of Columbus, Ohio, and Denver, Colorado, are the manufacturers.

The German export trade in barb wire to Japan is suffering greatly under the pressure of American competition. The Hamburg exporters are being forced to buy American barb wire, for their foreign customers have commenced to make their purchases in this line directly in the United States, thus evading the Hamburg middleman. Confronted by the alternative either to lose this trade or to buy American barb wire themselves they decided to take the latter course because they were afraid that the loss of this trade might result in the loss of trade in other lines, for it is a well known fact that business relations once formed will extend to other articles. Matters in the wire nail export are exactly similar. The Americans export wire nails via Hamburg to Japan at figures which the German wire nail manufacturers cannot attempt to meet.—American Manufacturer.

Electrical Progress.

At a meeting of the German-American Engineers at Pittsburg, Pa., September 5th, O. C. Reymann gave an account of the development of electricity as motive power on railways since 1879. Comparing the development of the steam and electric railways, he said that steam power was first employed on main lines, then transplanted to secondary and tertiary railways, and finally, though less frequently, to street railways. On the other hand, electricity first conquered the street railways and is now slowly forcing its adoption on railway branches and main lines. In 1887 there were in operation in this country only 13 miles of electric railway with 100 motor cars, in 1895 850 miles with 23,000 motor cars. Electric railways have proved a success in the suburban passenger traffic, and in their rivalry with the steam roads they are getting the better of the latter in this respect, owing to their greater frequency of trips and easier accessibility. On the main lines, however, great obstacles have to be overcome before the adoption of electricity as the motive power on such lines can be thought of. Tracks and bridges would have to be strengthened and straightened and the great expenses incurred would benefit for the present the passenger and mail traffic only, for there is no electric locomotive in existence that could pull a heavy freight train for long distances like the big mogul steam engines. Besides, there is very little prospect of a decrease in the coal bill. He then described the overhead trolley and underground or surface contact systems, declaring in favor of the latter for main lines, because the network of overhead wires in yards and on crossings and switches would be avoided. In conclusion, Mr. Reymann conceded that present electro-motive systems were not able to drive steam power from our main lines.

A number of railroads in the United States are contemplating placing electric headlights on the locomotives in place of the present headlights, but Theodore N. Ely, chief of motive power of the Pennsylvania Railroad Company, in speaking of the use of the electric headlight, said that the Pennsylvania railroad experimented with this system several years ago, and while it gave an excellent light, it would not answer the requirements, as on a two-track or a four-track road the rays from the locomotive coming in an opposite direction were so strong as to blind the engineer, and it would be some time before he got over it. Mr. Ely also said that of late years they have been reducing the size of the headlights for the locomotives. They were formerly 30 inches, but are now 16. Headlight oil, he thought, was more reliable and cheaper.

The syndicate of New York and Philadelphia capitalists which has been formed to construct an electric trolley railway between these two cities, has given out a contract for work that will cost $475,000. A power house, to cost $100,000, is to be erected near Bound Brook, N. J. The road, with all its branches, will be 1000 miles in length.

Practical Information.

Proposed Polar Exploration.

The expedition to Jones sound, planned for 1897, is intended to initiate a system of continuous Arctic exploration. Its object is to be the scientific research above indicated, and to this all else will be subordinated. Special attention will be paid to geology. Disasters having been plainly due to lack of a secure and always accessible base, the first object will be the establishment of a base at the mouth of Jones sound, which Julius von Payer calls "the one spot most suitable for such a base." Being in assured annual communication through the Scotch and Newfoundland whalers, a well housed and well provisioned party, with some Eskimo families, will be as safe there as anywhere on earth, and will have before it a field unequaled in richness and extent. To the north, the west coast of Ellesmere Land and Grinnell Land are to be explored; to the northwest, the triangle between those coasts and the Parry islands is to be rescued from the unknown; to the west, the interior of North Devon is an interesting problem; to the southwest, Prince Regent inlet may present an avenue to the magnetic pole; to the south, Baffin Land—with its Eskimo settlements, its herds of reindeer, its wealth in fishes and birds, its fossils and minerals—offers a tempting field, larger than the British isles. Even Greenland may not be beyond the sphere of that strategic point.

Such a system, once initiated, will cost very little. Lecturing tours and the sale of collections will defray a large part of the cost. Considering the enormous sums spent on Arctic exploration by governments and by individuals, it seems probable that when the system is once in running order it will not lack patrons. The cost of the initial expedition is estimated at $5000. Much smaller sums will probably suffice in subsequent years.

WITHIN a few months, unless some hitch occurs, will be begun the construction of the first railroad that has ever been built in Korea. It is to run from Seoul, the capital, to its sea port, Chemulpo, a distance of about twenty-five miles. The concession under which the railroad is to be built and operated was granted to an American, James R. Morse, and the road will be constructed with American capital and under the supervision of American engineers. Mr. Morse is the president of the trading company which carries on an extensive business in Korea. He was one of the first foreigners to enter the country, when it was first opened up in 1882, and he has spent a number of years there. He is on terms of personal acquaintance with the king, and about a year ago had the contract of placing an electric light plant in the sovereign's palace. He has recently obtained a concession for the working of several gold mines in the interior, and has sent for engineers from this country to develop them.—Railway World.

IN 1880 the birth rate per 1000 in the United States was 30.95. In 1890 it was 26.68, a decrease of 4.27 per 1000 of population in ten years. The decrease in the different States appears to have been nearly uniform. In Maine it was 3 per 1000; in New York, 1.65; in Pennsylvania, 3.30; in Indiana, 4.70; in Kansas, 5.67; in California, 3.72; in Louisiana, 5.50; in Texas, 9.47; in Kentucky, 4.90; in Georgia, 6.50; in Virginia, 7.76; and in other States in about the same proportion. The decrease was greatest in Massachusetts —11.67.

IT is often remarked, and particularly after the eruption of a volcano, that pumice stone ought to be plentiful and cheap, as quantities must have been ejected during the volcanic disturbance. As a matter of fact, however, none of the white stone in general use is obtained from active volcanoes. It comes from the deposits of the article discovered in one or two quarters of the globe, the best of which is at present to be found in the island of Lipari, situated in the Tyrrhenian sea. The island is mountainous in character and consists of tuffs and lavas, and of highly siliceous volcanic products. The district where the stone is found is called Campo Blanco or Monte Petalo, 1500 feet above the level of the sea.

ONE is justified in many cases in giving only a tentative belief to many of the big hailstone tales over which some travelers delight to spread themselves, says the *St. James' Budget*. A correspondent in Dholi, Behar, however, seeds the indubitable proof of photographs to quite convince us and our readers of the terrible nature of the hailstorm which occurred in his district recently. The storm passed over the greater part of the districts of Mozufferpore and Durbungah, but it appears to have concentrated itself with special fury over the indigo factory called Dholi. Here the storm was terrific, even for tropical regions, the hailstones weighing as much as five ounces. On an average they were as large, if not larger than cricket balls. It can be easily understood that the damage done was great. Not a whole tile was to be found in the roofs, trees were uprooted, birds were killed, and general destruction wrought all round. What is more astounding, the corrugated iron roofing over many of the factory buildings was riddled as if it had been shelled by a battery. We can quite imagine, as our correspondent informs us, that no storm like it has ever occurred in the district. Hailstones have, however, had the same terrific force in Africa, a sample of corrugated iron pierced in a like manner having been recently shown in London.

A PHYSICIAN advances the theory that the sensation of nausea has its seat in the brain and not in the stomach, and that relief may be obtained by cooling the base of the brain. He claims to have tested this often and thoroughly in the case of sick headache, bilious colic, cholera morbus and other ills in which the nausea is a distressing symptom, without a single failure; also that he once relieved the nausea resulting from cancer of the stomach by the application of ice to the back of the neck and occipital bone.

ACCORDING to the Cologne *Gazette* paraffine is found to be an excellent remedy for snake poison. The paraffine oil is worked thoroughly into the wound and then allowed to stand on it in a pool or the bitten part poulticed with paraffine.

CANADA proposes to erect a suitable monument to John and Sebastian Cabot at Bristol, England, to commemorate the voyage which these navigators took in 1497, which ended in the discovery of the Canadian coast.

ELEPHANTS in Africa are becoming so scarce that it is proposed to establish protected reservations for them on territory under British protection, like Somaliland.

"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colo.

UNITARIAN LITERATURE sent free on application. Address Postoffice Mission Committee, First Unitarian Church, corner Geary and Franklin streets, San Francisco. Mention this paper. *

M. H. WALSH, Secretary and Manager. C. G. BACON, President.

Sonora Land and Mining Abstract Bureau.

Sonora, Tuolumne Co., Cal.

Abstract of Titles to all lands in Tuolumne County made under the Durfee Self-Correcting and Adjusting System.

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MERCUR.

UTAH'S NEW EL DORADO.

Wonderful Development of the Camp Floyd Mining District.

The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $900,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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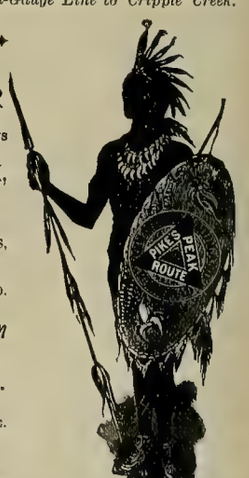

Chair Cars on Morning Train . . . . .

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPT 15, 1896

567,702 —FRUIT PITTER—Allman & Ingham Pasadena, Cal
567,737 —FAUCET—J H Beare, S F
567,736 —ALMOND SHELLER—A H Cope, Danville, Cal
567,806 —MINER'S LANTERN—Hattie Delzell, Jackson, Cal
567,643 —ANNUNCIATOR—H P Frear S F
567,741 —PUMPING APPARATUS—P Frichette Sheridan, Cal
567,781 —SUSPENDERS—Holt & Eldred, Seattle, Wash
567,501 —PERMUTATION LOCK—S C Houghton, S F
567,618 —THRESHING MACHINE—H H Lamont S F
567,718 —PHOTOGRAPHS IN RELIEF—T C Marceau, S F
567,491 —COMB—P W Mathews Eureka, Cal
567,654 —ELEC WHISK—T A. Moody, Santa Monica, Cal
567,813 —TREE SUPPORTER—E. Morgan, Fresno, Cal
25,011 —DESIGN FOR CORSET—A. J Claveloux, S. F.
25,013 —DESIGN FOR GUITAR—C Knutsen, Port Townsend, Wash

NOTE Copies of U S and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order. American and Foreign patents obtained and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CLASP FOR GARMENT SUPPORTERS.—Andrew Thomson and James Drever, San Francisco, Cal. No. 567,421. Dated Sept. 8, 1896. This invention relates to a clasp or fastening to be used in conjunction with a garment supporter, the clasp serving to secure the stocking or other garment and connect it with a supporting band or strap. It consists essentially of two interlocking sections, the lower end being bent into a hook with a narrow neck and a wide arched top, and the other in inverted U-form adapted to slip inside the tip of the first and interlock with the neck thereof; a plate with the opposite ends of which the upper ends of the two sections are pivotally connected, the intermediate portion of the plate being made concave so as to swing back between the sides of the first section when the two are interlocked, and in conjunction with this is a reflexible strap enclosing the plate and stitched thereto.

ADJUSTABLE SOCKET WRENCH.—Robert McDonald, Magalia, Cal., assignor of one-half to S. P. Low and G. R. Hendrix, same place. No. 567,405. Dated September 8, 1896. The object of this invention is to provide a simple and effective means for readily and accurately adjusting the jaws of a wrench to vary the space between them to suit different sizes of nuts. The wrench comprises a stock having pivoted to one end thereof opposing jaws provided with divergent extensions behind their pivotal centers, a sleeve adapted to slide upon the stock and engaging said extensions whereby the latter are moved to or from each other to cause the jaws to separate or approach, and a clutch nut-threaded on the stock and engaging the sleeve for adjusting it on the stock.

PUMPING APPARATUS. —Petar Frichette, Sheridan, Cal. No. 567,741. Dated Sept. 1, 1896. This invention has for its object the provision of simple and effective mechanism for applying the power by hand or a windmill or a horse-power requiring a reciprocating or oscillating movement, said application of power being made by means in the use of which any length of stroke may be given the pump rod without the employment of a crank and the consequent increase of power which follows an increase of said crank to provide an increased stroke. The pumping apparatus consists of a pump, the rod of which is longitudinally slotted, a roller mounted in said slot with its axis at one side of the vertical line of the rod, a horizontal shaft mounted in the frame of the apparatus, approximately in the vertical plane of the axis of the roller, a segment secured at its upper side to said shaft, a segmental cam passing through the slot of the rod and secured at one end to the shaft and adapted to impinge on said roller, a driving segment secured vertically in line with the driven segment, said driving segment being pivotally secured at its lower side, and having its upper side engaging the lower side of the driven segment, and means for oscillating the driving segment.

ALMOND SHELLER.—Alvinza H. Cope, Danville, Cal. No. 567,736. Dated Sept. 15, 1896. The object of this invention is to provide a machine which, while adapted for the shelling of various nuts, is especially adapted for the shelling of almonds, in which use its particular advantages are its adaptability to shell almonds whether or not the hull remains fast to the shell, the rapidity with which the nuts may be shelled, and the small number of kernels mutilated in the shelling process. The machine consists of a casing, open at top and bottom, a concaved grating formed of a series of parallel spaced metal bars, so shaped as to form downwardly diverging spaces, a rubber or grating over said concave having a curvature greater than that of the latter and having parallel spaced bars, said bars and the rubber and concave being adapted to split the shells of the nuts by the opposing crushing action of the edges formed along the bars at the junction of the inclined sides with the flat tops and bottoms. The driving shaft on which the rubber grating is mounted is vertically adjustable for adjusting the rubber closer to or farther from the concave, and said shaft is operated by levers on each side.

Coast Industrial Notes.

—The paper mill at Lebanon, Oregon, is to be lighted with electricity throughout.

—It is expected that the San Francisco and San Joaquin Valley Railroad will be ready for traffic out of Fresno by Oct. 1.

—The South Yuba Company expects to have the great reservoir dam above Clipper Gap completed in about six weeks.

—The last stone was laid on the new Parliament buildings at Victoria, B. C., last Saturday. Their cost will exceed $1,000,000.

—The Vance railroad in Humboldt county has been completed and the first train has been run over it to Samoa, the terminus, from which steamers will run to Eureka.

—News comes from Washington that a large amount of the $21,000,000 appropriation for coast and harbor defense, made at the last session of Congress, will be devoted to strengthening the defenses of San Francisco harbor.

—The Board of Supervisors of Sonoma county have granted a franchise for the building of an electric railroad from Santa Rosa to Sonoma. The new road will run through the Los Guilicos valley, via Melitta, Agua Caliente, Kenwood and Glen Ellen, thence to the Napa county line and on to the Embarcadero landing. Another line will be constructed from Santa Rosa to Healdsburg and other places. The Santa Rosa line is to be constructed in two years.

—The Union Iron Works of this city have secured an award of contract from the Navy Department to build a torpedo boat with a speed of 30 knots. Her dimensions will be: Length on water line, 210 feet; beam, 20 feet; draft of water, 6 feet; displacement in commission, 273 tons. This vessel is to be of similar type to the Desperate class, now being built for the British navy. It will require 5750-horse power to obtain the speed of 30 knots. The Union Iron Works have secured the right to build the Thornycroft boiler for this boat, and it will be built by them at their works. This vessel will have two tubes for launching torpedoes and a battery of six 6-pounder guns, will carry a crew of 56 men all told, and will be the first boat of her class built in Pacific waters.

Recent California Mining Incorporations.

Henrietta Mining Company, San Francisco; J. H. and R. W. Mastic of Alameda, J. A. Hennessey of Oakland, N. McGraw of Santa Cruz, M. B. Miller of San Francisco; capital stock $50,000, of which $25 has been subscribed.

Keystone Gold Mining Company, San Francisco; E. C. Loftus and H. M. Smith of Oakland, W. H. Clary of Stockton, J. M. Wright and G. D. Danskin of San Francisco; capital stock $1,000,000, of which $760,000 has been subscribed.

Specimen Gold Mining and Milling Company, San Francisco; R. F. Woods, J. J. Meyers, P. Diedesheimer, R. G. Hooker and W. E. Davis, all of San Francisco; capital stock, $500,000; paid up, $25,000.

Personal.

E. W. CHAPMAN of El Dorado county has been nominated for the State Senate.

FRANCIS HEURTEVANT, who is operating gravel mines on the Trinity river, is going to France on a visit.

BARON DE BATZ, owner of gravel mines on the Amoor river in Siberia, who operated several years in Montana, is in this city.

J. H. TIBBITS, who has been in Rhodesia, South Africa, for a year for an English syndicate, has returned to Sutter Creek, Amador county.

CHARLES D. WALCOTT, Director of the United States Geological Survey, is in the White mountains, in Inyo county, studying up Cambrian formations, and will come to this city before his return to Washington.

MARSDEN MANSON, chairman of the State Bureau of Highways, has received and will probably accept an invitation to attend the International Geological Congress to be held in St. Petersburg, Russia, in August, 1897. The invitation carries with it a pass over all the railways of the Russian Empire.

Recently Declared Mining Dividends.

Swansea, Utah, $5000.

Central Eureka, Utah, $30,000.

Bullion-Beck, Utah, $30,000.

Mercur, Utah, $30,000.

Cariboo mine, British Columbia; $16,000; a total of $111,000.

Isabella Mining Co., Colorado; $22,500, payable Sept. 25th.

Iron Mountain Mining Company, Montana, $5000, payable Sept. 25th.

Mammoth, Utah, $20,000; payable Oct. 1st. This makes a total of $1,110,000.

Commercial Paragraphs.

MESSRS. BIRCH & CO., 120-135 First street, in this city, are building a large Lightner quartz mill and other mining machinery which will be shipped in a few days to John Nation & Co.'s mine near Redding.

THE Hercules Gas Engine Works of this city are building a hoist for the Delaware mine at Nevada City, owned by McMurray and Martin, a hoist for Monroe & Birney of Sonora, and several gasoline pumping engines for mines.

THE Colorado Iron Works Co., of Denver, Colorado, are rapidly pushing to completion a 48x120-inch smelting furnace for the United Smelting and Refining Co., at East Helena, Montana. They have recently built and shipped to this same company two double-pot slag trucks.

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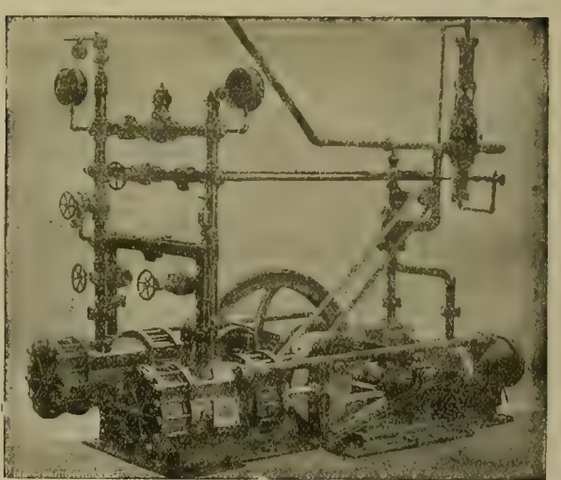

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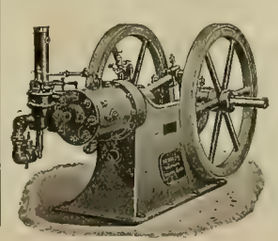

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Mining Summary.

CALIFORNIA.

Amador.

Republican: The El Dorado mine, formerly called the Mahon, which has been lying idle for some time, has been purchased by T. C. Mahon of Alaska, and resumed operations last week.

The Grover mine, which for some time has been shut down, will resume operations in a few days.

The Del Rey mine at Middle Bar has closed down, but will probably resume operations again about the middle of November.

The Boston mine, which employs about sixty men, will shortly close down for a month or six weeks, as they intend to sink a new shaft to the depth of 1000 feet. About fourteen men, including the foreman, will be retained to do this work.

There are fifty-two men employed in the Union mine at Pine Grove at present, and as soon as the extensive improvements on the 30-stamp mill are completed, quite a number more will be added to the list. The shaft is down 400 feet, and the ledge improves as they go deeper.

Ledger: The shaft at the Gwin is down 1375 feet. The cutting out for a 15,000-gallon water reservoir at the 1200 station is completed. There are reservoirs at the 300 and 700 for surface water and for water made in their shaft. The larger reservoir is to take the water from the old works, which is now draining into the new works from the hanging wall gouge at about 1195 feet. Mill building is progressing rapidly, ten carpenters being employed on the building.

The White Bros. are down 75 feet with their shafts, and have their pump in working order.

Republican: The Mechanics' mine has started up. It is proposed to put in a new hoist, shaft and mill.

The shaft of the South Eureka has now reached a depth of 1300 feet. The 20-stamp mill is running night and day in good rock.

The Central Eureka is operating the old Summit mine, one-half mile south of Sutter Creek. The owners have erected substantial hoisting works and will sink their shaft to a depth of 1000 feet.

Butte.

Mercury: The Faulkner group of mines at Forbestown have been bonded by capitalists from Texas, who will soon proceed to open them up.

H. P. Stow of Forbestown has purchased the Golden Queen quartz mine, which adjoins the Gold Bank.

Calaveras.

The Boston mine, near Mokelumne Hill, has added ten stamps to the twenty now in operation. A large quantity of low-grade ore is in sight. A new hoist has also been added to the works.

Citizen: Taylor brothers are opening their mine on San Domingo.

Fred McNear of the Iron Rock mine proposes sinking a shaft at the mouth of the tunnel recently run.

Experts have been prospecting the Pfortner & Burn's gravel mine and the indications are good for reopening.

J. W. Provard has been purchasing machinery in San Francisco preparatory to opening up the Reed mine near town.

Sullivan and Snedigar are preparing to operate the Cassinelli gravel mine at Central Hill on an extensive scale. A force of fourteen men are grading for the new hoisting works.

The old Star and Excelsior mine at Hog Hill which was worked in early days and considered rich in copper seems to be equally valuable for its gold-bearing quartz. Considerable prospecting on quartz has been done, the best indications being seen in the old copper diggings, which consist of two shafts, one of which is 126 feet deep and shows a well defined ledge over 6 feet wide.

At the Cuneo quartz mine, near San Antone camp, Frank Cuneo and sons are taking out good rock. They have a 5-foot vein, mostly sulphurets, which is improving as developments are being made.

The Basco mine, bonded to Montgomery and Requa of San Francisco, is showing a 4-foot vein in the tunnel, which has been extended 90 feet. The same parties are working the old Esmeralda, and will soon have the water all out.

The quartz claim owned by Antone Illich & Co. is about to be bonded, and it is expected work will begin on it immediately.

Terwilliger & Co. are putting in a flume on Tunnel hill, French gulch, preparatory to working an extensive deposit of old tailings which are said to prospect well.

Chronicle: The Esperanza Company will proceed at once with a three-compartment shaft to be carried down 1000 feet or more, on the site of the present working shaft, which makes it necessary to suspend work at the mill for the time being. When the shaft enlargement is finished to the 300-foot level it will then become practicable to continue sinking the shaft and again supply the mill with ore mined from that level and those above it.

Active operations are to be resumed on the Melones Consolidated mine, near Robinson's Ferry. W. C. Ralston will start work in the interest of Eastern capital.

El Dorado.

(Special Correspondence).—El Rio di Oro Mining Company are running a bedrock tunnel and placing 2000 feet of pipe on their recently acquired property 9 miles south of Placerville. This is a gravel plant. A. A. Wood is the superintendent.

J. W. Houston is working the river bed, employing thirty men at Murderers' Bar in the Middle Fork of the American river about 16 miles above Georgetown.

At the Ohio mine, one mile from Greenwood, a company of California people, incorporated under the name of the Greenwood Gold Mining Company, are progressing favorably. They began operations last March. Their shaft is 265 feet and they have drifted 250 feet. They operate a steam hoist. The property is on the Greenwood mother lode belt, and the formation is porphyritic slate. C. W. Keeney is superintendent.

Development work in the Kelsey district is moving along with good results. Three additional properties were added to the list on which shaft work is being rapidly pushed along.

The Welch mine, adjoining the Ohio near Greenwood, has been sufficiently prospected to warrant the company to incorporate, for which steps are now being taken. The company is composed of San Francisco people.

The tunnel on the Landeckers, two miles from Placerville, is being rapidly driven. This will be a gravel milling proposition.

Active work has been inaugurated on the Gentle Annie mime, the property recently bonded by T. T. Lane, two miles north of town, by sinking new shafts. At present two shafts on the Fortuna and one on Poverty Point are making rapid progress. There are fourteen claims in the group.

Despite the campaign our hotels are crowded by visiting mining men, both prospectors, experts and capitalists.

Placerville, September 21, '96.

Kern.

Californian: At Randsburg Smith & Senters are preparing to put in hoisting works on the Little Butte for the purpose of sinking to the 150-foot level, when they will begin drifting.

The Olympus mine, of Mooers, Singleton & Burcham, is down 100 feet, and they are drifting on the 50-foot level, on which a tunnel has been driven to the surface of the hill.

There is considerable dry washing still going on with good results. A Los Angeles company is arranging to put in a pulverizer and dry washer at the St. Elmo, which will handle 200 tons of earth a day.

The contract for sinking another well at the Garlock mill has been let and the work is now proceeding. It is estimated that, when completed, this will give additional water—enough to keep the mill running at its full capacity day and night.

Mariposa.

(Special Correspondence). — The Denver mine, near Haywards, S. H. Haywards and James S. Johnson owners, was inspected this week with a view to purchase by English experts. There is about 200 feet of tunneling along a very large, well-defined ledge said to average $3.76 in gold. The experts returned to San Francisco, taking samples with them.

Considerable work is going on at the Sellick mine at Haywards. Two shafts are down, one 50 feet, another 150 feet. The owners are W. E. Hensley (superintendent), W. E. Sellick, John G. Elliot and J. F. Clapp of Chicago. Extensive machinery has been ordered and the Sellick may now be regarded as something more than a prospecting show. The rock shows free gold in places, is heavily sulphureted and is easy to mine and mill.

Angus Mackintosh is in San Francisco making arrangements for machinery to start up the Triumph and Hayseed mines at Whitlocks. It is Mr. Mackintosh's intention to incorporate the property at an early date.

At the Louisiana mine, sixteen miles above Coulterville, A. C. Cable superintendent, steady development work is going on. The hoisting and pumping machinery is very substantial and the owners propose to go to a depth of at least 800 feet. Indications up to the present are so far satisfactory that a 10-stamp mill is to be erected upon the north fork of the Merced river, which is less than half a mile distant.

The Hites mine, at Hite's Cove, has been shut down for some time past. An incorporated company, of which John I. Minear was superintendent, attempted to reopen it, working under a bond. The time ran out and Mr. Hite would not give an extension. Parties have been visiting it lately with a view to securing a working bond from Mr. Hite. There is a very large and complete plant on the ground, including forty stamps. This property has exceptionally cheap water power from the Merced river.

Colonel Trevelyan of Fresno has returned from England. Before his departure he secured nearly a dozen claims in the Sherlocks district. It is now stated that extensive prospecting work is to be begun.

A few prospectors are working on the Mariposa grant, but there is nothing of importance to chronicle.

The Mariposa Electric Power Company has men at work on its new ditch from Broadhead to Benton Mills.

No work is at present going on at the Red Banks.

Coulterville, Sept. 23, '96.

Miner: On the Reynolds mine two drifts are being run on the 100-foot level and a good vein of quartz is in sight.

The two mines known as the Independence and North Fork, owned by Joseph Adams, have been bonded to Mr. Donaldson of Coulterville. Development work will soon be commenced.

Three of the directors of the Merced Gold Mining Company are here making an examination of the property. They are C. H. Palmer, Butte; J. A. Coram, Lowell; J. F. Moffett, New York. They are accompanied by T. C. Gorrie, a mining expert, who was spoken of some time ago as the new superintendent of the M. G. M. Co., and C. Allen, superintendent of the Boston and Butte smelters, at Butte.

A hoisting plant is reported to be put in place soon on the Never Sweat mine. The showing made by the mine so far is very gratifying to the owners, and they are confident they have a first-class property.

The Tyro is still running steadily on good pay rock. The last reports are to the effect that rich ore in considerable quantity is being uncovered.

Nevada.

Union: The W. Y. Q. D. Mining Company advertises for bids to sink a shaft 200 feet on the Parr ground, adjoining the W. Y. O. D. on the east. In the early days considerable gold was taken from the Parr ground.

Transcript: Negotiations are pending for the transfer and reopening of the Texas mine. The property consists of 160 acres of patented ground. There are four parallel veins, all of which have been worked more or less to the depth of 70 feet. A good deal of money first and last has been taken out. A portion of the big Blue vein, so rich in the Murchie mine, runs through this property.

Placer.

Colfax *Sentinel*: A new quartz mill will soon be erected at the La Trinidad mine, in Sailor canyon, sixteen miles southeast of Cisco.

The Nissen quartz mine, near Colfax, on the Forest Hill road, has closed down temporarily owing to the death of one of the parties who have a working bond upon it.

The Eureka tunnel is now in 1650 feet. This leaves only 350 feet remaining to the point where gravel will be reached.

San Bernardino.

Sun: J. M. Crawford and J. H. Mason went up the wash on Lytle creek with a dry washer, more for the purpose of testing the washer than any idea of securing gold. They went to a place where placer mines had once been located, set up the machine and for two hours worked what were supposed to be tailings. They were surprised to find that the cleanup for this short run brought out $3.60 worth of gold.

San Diego.

Ramona *Sentinel*: Bailey Bros. are working on good quartz in the Redmond mine.

A force of men has been put to work at the Gold King mine.

The concentrators are in place at the Owens mill and everything is in readiness to start crushing ore.

Matt Werner has discovered a rich body of ore in Boulder creek, between Stonewall and Julian, in the heart of the mining country, and the spot has been passed over for years by prospectors.

Shasta.

Free Press: Joseph Thompson and sons, lessees of the Mammoth mine at Old Diggings, have encountered a rich ore vein twenty inches wide in their 100-foot drift. The mine is located near the Hart mine.

Two new tunnels and one shaft have been started at the Garfield mine, at Rich gulch, new timbers are being placed in the old tunnel, and some new building done.

Courier: There will soon be a new mill up French gulch, with 400 tons of rock from the Brunswick mine to start on.

It is reported that the new smelter at Keswick turned out more matte the first four or five days it ran than the first smelter did during all the time it was in operation.

Forty-three years ago the new placer mines at Pittsburg and Elizabethtown, near what is now Copper City, were booming.

There has been hauled a lot of ore from the Coleman estate mine near Fort Dingee to the Keswick smelter.

Sierra.

Mountain Messenger: At the Slug Canyon mine the contractors have completed their work. Mr. Copeland is still driving the tunnel ahead as rapidly as possible with eight-hour shifts, and is nearing a point where he expects to strike the ledge.

E. N. Polley's hydraulic mine at Brandy City is fitted up and ready for next season's water.

Siskiyou.

Journal: The Colorado company, which recently purchased the old Shinar mine on Thompson creek, have about forty men at work on their ditch, which is to be about three miles long.

The French mining company on Wild Cat creek have not been working their mine for some time, owing to a want of sufficient water. They expect to build a ditch soon, which will furnish them with all the water they need. The owners are also interested in the extensive French mine in Trinity county.

It is reported that the mines down on the Klamath are showing prospects of a successful season. The weather has been favorable to working this year, and under good management most of them should pay well.

Journal: The Chamberlain & Timmons mill on Mill creek will be completed this month, and they will commence crushing rock from the Mabel mine, on the divide between Oak bar and Scott bar, the 1st of October. They now have about 200 tons of ore on the dump.

The Hiatt, Garrette & Co. Gravel Mining Co. of Yolo county have finished a large wing dam in the Klamath, below the mouth of Scott river, and, with a force of 26 men, are running day and night, washing the top gravel, which pays well.

The placer mines in the Salmon River country will be started up just as the fall rains furnish sufficient waters. W. P. Bennett has several mines near the Forks of Salmon river which will be opened up in a short time.

Trinity.

Journal: The Poker Bar machinery is all up. The mine will start in a few days.

Tuolumne.

Union-Democrat: The Black Oak district northeast of Sonora is alive with prospectors and owners of hitherto vacant or abandoned claims. A success has been made of the cyanide process at the Black Oak mine. The Dead Horse, Confidence, Belleview, Lady Washington and several other properties in that belt are coming to the front.

At the Mammoth on a level being driven from the winze which is being sunk from the end of the main working tunnel, a large body of rich ore that has every indication of being permanent has been struck.

B. M. Newcomb, the general manager of the Santa Ysabel, arrived last week to accept from the contractors the new power machinery just erected at the mine. It is reported that while here he will arrange to start work on Whiskey Hill and increase the present force at the Santa Ysabel.

Richard Chute, of the Rappahannock mine, is working a large crew on development work.

Work on the Eagle tunnel has been resumed, the water in the shaft recently tapped having all escaped.

The owners of the Hibbin mine in the Black Oak district are arranging to start work on the shaft. It has been abandoned for some time, but will run steadily this winter.

Independent: The Tarantula has been sold for $10,000.

A pocket of $1500 has been taken out of the Fuchs mine at Saw Mill Flat.

NEVADA.

H. A. Miller has discovered a gold-bearing lead in Pyramid district. He has uncovered the lead in a number of places a distance of nearly 1000 feet. It is about a foot wide, and there are streaks in the vein which are rich in gold. The ore is decomposed and slightly stained with copper.

At Tuscarora, since the resumption of work upon the property of the Dexter Mining Company, under its reorganization, a force of some fifty men has found employment in the mine and mill. The cyanide plant which has been put upon the ground is working well.

Negotiations are pending for the sale of the Tono Rose group through Salt Lake parties, with Colorado capitalists as the purchasers.

Territorial Enterprise: The Buckeye placer gold mines, about thirty-five miles from Carson, are comparatively idle at present, from lack of a good supply of water to wash with. Next winter they will have much better and more extensive arrangements for water supply, storage and sluicing. C. D. Lane, who offered $250,000 for these mines, was here last Monday on his way to Dayton to look at the La Grande Oro gravel mine.

The Zirn mine at Pine Nut will start up again. It is a quartz gold mine and some portions of it have yielded rich ore.

Logan & Hully's mine, twenty miles east of Carson, is actively working. It is principally a gold mine.

At Pine Grove, some seventy-five miles south of Carson, Wilson & Sons are working their quartz gold mine more effectively and productively than ever before. There are about fifty men working in the camp. The Wilson mine has been working with varied success for the past thirty years.

La Grave & Gardner's recent mining discovery up in Douglass county, at the foot of the Pine Grove range, is having a prospect shaft sunk upon it, and a sample run of the ore will soon be extracted for a practical milling test. It shows rich in native silver and gold.

At the base of the Sierra Nevada, in one of the ravines that flow into the head of the Washoe valley, Leyman Jones is washing out gold with a rocker, making $3 or $4 a day.

Silver State: The new mining district of State Line, on the boundary between Nevada and Utah, embraces an area 6 or 7 miles wide by 12 long. It is about 15 miles from the old grade of the railroad from Milford. Nearly all the ground within this district is located by cowboys and ranchmen, who hold their claims at figures ranging from $50,000 to $200,000 each. There are about 100 men in the district prospecting and working claims. The mineral-bearing zone consists of a silver vein lying between porphyry. Some of it is very rich and carries from 500 to 600 ounces of silver. The gold is found in hard quartz and is a free-milling ore. It runs from $10 to $12 per ton. Most of the prospects are in the gold-bearing vein. The district has an elevation of between 7000 and 8000 feet, and there is frost every month of the year. Timber is abundant, but there is not enough water yet for milling purposes.

OREGON.

Telegram: Two groups of copper mines in Josephine county, at the headwaters of the Illinois river, close to the California line, have been thoroughly developed by Baltimore capitalists at the expense of $475,000. They are perfectly satisfied with the results attained, and had commenced to reduce ores, but found that they needed some additional furnaces to make a perfect success, and are now putting these up, and will in a few weeks be turning out at least ten tons of copper a day. The Siskiyou group covers 500 acres and is 35 miles from Crescent City. The Elmer-Brown ground is near Waldo. The same parties own both mines. These are 30 and 20-ton plants and there are 1500 tons of ore waiting reduction that has 25 per cent copper. There have been tunnels driven into the mountain 800 feet on one side and 600 on the other.

WASHINGTON.

Snohomish *Tribune*: M. Montan and L. Lundelin have completed a sale of the Billy Goat, Grizzy, Atha and Grizzly Extension claims to the Clear Creek Copper and Gold Mining Company. The property lies north of the famous Helena. The ore assays 10 to 40 per cent copper, $13 to $40 in gold and $5 to $6 in silver. The purchasers have formed a corporation with a capital of $600,000.

BRITISH COLUMBIA.

Kootenaian: There has been considerable excitement in Kamloops over the discovery near that place of mineral deposits. The first discovery was made about six months ago, since when about sixty claims have been located. The formation is diorite mixed with eruptive rocks, and is much broken by porphyry dykes. Topographically, and in the character of its mineral, the country bears a

striking resemblance to Trail creek, the ore being seamed along a series of fissures, with a northeast and southwest trend, which has been followed for a distance of three miles. The mines can be easily worked, being near the railway and easy of access.

Nelson *Tribune*: The Josie No. 2, a free-milling property south of the Poorman, has been bonded to a Minneapolis syndidate for $30,000, a first payment of $6500 having been made.

Spokesman-Review: In the Methow country the Red Shirt property is under lease to an English syndicate, and they are putting in a 20-stamp mill.

A strike is just reported on the Delaware at Rossland, northeast of Jumbo. The ore is an iron sulphide in a quartz gangue.

The owners of the Cariboo mine at Camp McKinney, B. C., contemplate putting in five additional stamps in their property, making fifteen in all.

The Rosiyn Gold Mining Company, with head quarters at Spokane, has been incorporated with a capital stock of $1,500,000.

Spokane *Chronicle*: At Lookout mountain, Rossland, the Little Giant group, consisting of the Little Giant, Copper King, Little H. and Little Vitte have been sold to William Bennison of Everett, Wash., for $25,000 cash by Charles Northridge, Charles Bates and W. Hornshoe.

The Prince of Wales group on Lookout mountain, Trail, has been sold to an English syndicate for $50,000 cash, which has already been paid and transfer made. The claims consist of the Prince of Wales, E. V. Debs and Emma R.

Ashcroft *Mining Journal*: On the Bonaparte river, about sixteen miles north of Ashcroft, 400 acres of ground has been located for mining purposes by the English syndicate.

A. J. Hughes and A. R. Code, from Manitoba, have formed a company to stock the Brindle group of five claims, the Mount Mabel Mining and Smelting Company, Limited, with a capital of $1,500,000.

Work has been suspended on the Mountain Chief until a compressor plant can be put in operation. This property has shipped over $100,000 worth of ore.

ALASKA.

Alaska News: The Julian Mining Company have milled over 400 tons of $10 ore since their new mill began operations. Between 300 and 400 tons yet remain on the dump.

Last fall what is described as a mountain of quartz was discovered and located three miles above Forty Mile and a mill test of several tons has been sent to San Francisco. The ore is free milling and several assays have given returns of from $7 to $11 per ton in gold. Should the test prove satisfactory a stamp mill will be taken in this fall and erected.

Early this year two ledges of gold-bearing quartz were discovered on the hillside on Gastineau channel about 1000 feet above tide water and directly opposite the Treadwell mines. These ledges are in width respectively 20 and 50 feet and are running with the formation, having well defined black slate walls. Ten men have been put to work on the ledge, a contract having been let to run a 4x8 tunnel 100 feet which will crosscut both ledges.

The B. B. M. & M. Co., is putting in a gravity wire tram from the upper end of the Bear car tram. It runs diagonally up the side of the mountain at an angle of 22½° and is to be used to convey ore from the Northern Belle to the mill. There are no towers and as the distance between terminals is 3100 feet it will be the longest single span in Alaska. The tram will have a carrying capacity of 300 tons in ten hours.

The Ebner Gold Mining Company will order an additional five stamps for their mill now in operation in the Basin.

Eighteen miners are now at work driving tunnels, stopes and crosscuts on the Northern Belle, preparatory to opening up the mine. Considerable ore has already been taken out and it is thought the mill will shortly resume operations.

IDAHO.

It is reported that the Petit mine at Atlanta has been sold to a French syndicate for $250,000. The owners are all residents of Boise.

The Bear Creek Alluvial Gold Mining Company, a Scotch corporation, has completed its outfit for placer mining in Rocky Bear district. A double 4-foot flume, 3000 feet in length, has been constructed: a car track has been built along the creek, upon which a derrick is moved that can lift seven tons of debris at each load. The latest approved apparatus for saving the black sand has been brought into use. The company owns five miles of virgin placer ground lying just ahead of the works.

It is reported that the Florida Mountain Mining Company has closed a deal for the Humboldt mine on Florida mountain, the property of John Feour and Taylor Gearheart. The price is reported to be $100,000 cash.

De Lamar *Nugget*: The large brick tank placed in the annex of the De Lamar mill is being removed, and will be replaced with small wood tanks of two tons capacity each, constructed upon quite a simple plan. These tanks will be 9 feet in interior diameter by 4 feet in height, and will contain a simple four-armed sweep with plates of boiler iron beneath each arm to serve as anodes for the electric current. The cyanide solution will be charged into the pulp in the tanks, which will have copper-lined bottoms, upon which will be a bed of quicksilver, which will constitute the cathode of the current. The pulp solution, when its value has been exhausted, will be drawn off through a plughole in the side of the tank. The quicksilver will remain upon the bottom until a number of charges have been made, when it will be drawn off through the bottom as often as a cleanup is made. Each tank will contain a two-ton charge every twelve hours, or four tons a day. Only two tanks will be put in at the present time, but if they prove satisfactory twelve more will be added, that number covering the foundation provided for the brick tank now being removed. A plant with two tanks, constructed on the same principle, is now in successful operation in Boulder county, Col., and another at the Old Faithful mine in Montana.

The De Lamar mine has paid some $40,000 per month in dividends during the past six years.

The Trade Dollar is producing from $60,000 to $100,000 a month.

UTAH.

(Special Correspondence).—The Mercur Mining and Milling Company are doubling the capacity of their cyanide plant. This will increase it to 450 tons per day.

The Sacramento Company are increasing their milling facilities to 120 tons per day. This will make the total daily output of this camp 750 tons.

Inside of thirty days we expect to see three more mills under construction.

The drill hole on the East Golden Gate mine is still going down at the rate of 20 feet a day and has now attained a total depth from the surface of 1000 feet.

The Wonder, Hecla and Seals, all of which have struck the 400-foot mark, and are located north of the Golden Gate, are still sinking and expect every day to strike pay ore. The Brick Yard, which lies between them and the Golden Gate, already has ore in half a dozen shafts, inclines and tunnels, and has enough blocked out to justify building a mill, which the management state they will commence grading for within the next thirty days.

It is reported that within fifteen days work will be commenced on the grading for the Golden Gate mill of 400 tons daily capacity.

The Northern Light Company, who have a large body of gold and silver ore, will start on their mill within thirty days.

Mercur, Sept. 21, '96.

Tribune: At Mercur a reduction in wages took place at the Sunshine mine last week. The shovelers were reduced from $3 to $2 50 per day. As an offset their board was reduced from $1 to 75 cents.

The Wonder is getting into a little softer formation and is down 412 feet. At every two feet samples of the ore are kept so that a perfect record can be seen of the formation from the top to the bottom of the shaft.

Owing to the low price of metal there will be no shipments of ore for the present from the Northern Light. The ore body is well blocked out so that an abundance of material can readily be got out as soon as the new mill is erected.

The Mercur mine is now working ninety-three men.

The Hecla is down 460 feet. After going through 22 feet of yellow porphyry they have got into about 5 feet of darker formation which has a more promising appearance.

The Malvern Company is developing its group by a drift from the 600-foot level of the Sunshine, which the latter has already extended 250 feet on high-grade milling ore. The Malvern Company will continue the drift for 400 feet on the strike of the vein into its own ground.

The Bullion-Beck is now marketing about 100 tons daily and treating nearly double that amount at their mill. The rich strike of ore reported recently on the 700 level is showing up in magnificent shape and has fully doubled in width, at the same time maintaining its high values.

The force at the Sunbeam is to be doubled at once and preparations are being made for a shipment of good copper-silver ore within a short time.

A European syndicate has procured a bond on the property of the Winnamuck Mining Company. The price is said to be $100,000.

At a meeting of the Board of Directors of the Peruvian Mining Company it was decided to put a tunnel in 500 feet to intercept the vein upon its dip. For this purpose the Board decided to levy an assessment of 4 cents a share, payable at once.

At Park City the reports from the Comstock are better than ever. Two good bodies of ore were encountered last week.

Seven hundred feet more of excavation and the Ontario tunnel will tap the works of the old Daly in the 1700-foot level.

The Crown Point shaft is now 165 feet deep.

Some samples of ore from Ashley valley, near the Uintah reservation, show copper running as high as 60 per cent, while associated with it are twenty ounces in silver. The owners are now employing about thirty men, and are shipping to Denver.

WYOMING.

It is reported that a discovery of gold ore has been made in Grand Encampment creek, forty-five miles southeast of Rawlins, Wyo.

Rock Springs reports state that E. A. Green of New York is having a survey made of placer property at Oregon Buttes, Carbon county, with a view to purchasing the property, which includes 5,000 acres, if water can be put upon it.

MONTANA.

Butte *Miner*: The Hope mine, recently purchased by Eastern parties, has started up with thirty men. The management is getting ready to sink a new shaft. The old shaft is to be cleaned out and used as an air shaft. Plans have been prepared for a new concentrator.

Reports have come in of rich strikes in the placers in Wisconsin creek. A company has been formed to bring a 35-mile ditch from the south fork of the Madison to work deposits on the Big Baldy.

Inter-Mountain: At the Anaconda, High Ore No. 2 shaft has reached a depth of 1,365 feet, and work is being actively pushed on a tunnel which will connect the 1200-foot level of the High Ore with the 1000-foot level of the Modoc. The running of the tunnel is a part of the programme of the Anaconda company which a long time ago started in to connect all of its properties to prevent accident in case of fire or other disasters, and when the Modoc connection is made a person may decend the Buffalo shaft on the west and traverse the whole length of the Anaconda company's possessions.

Advices from Boston indicate that the Butte & Boston reorganization scheme will be carried out at once. Mr. C. W. Goodale, who had been appointed to make an examination of the properties here, sent in his report some days ago and it is believed has been acted on. Some definite action is looked for within a few days.

SOUTH DAKOTA.

Black Hills *Times*: Another chute of ore has been discovered in the workings of the Kickapoo property, on Yellow creek. It was struck in the main tunnel, now in about 140 feet.

The upper ore contact recently discovered on the Tornado group has been opened on various points on the surface and its continuity proven for a distance of about 800 feet east and west and 400 feet north and south, and is evidently the same contact that is exposed in the Fannie shaft at the 80-foot level and in the Tornado workings.

The Union Hill stamp mill, in Galena, is crushing 30 tons of ore per day.

The Elkhorn Railroad has located and secured right of way for the new shaft to the Tornado workings. It will connect with the Harmony, on the Fantail side of the hill.

COLORADO.

Denver *Republican*: At Cripple Creek the Empress of Japan Company has started a new shaft on the line established for the vein to follow by the development in the Arcadia.

The new vein cut in the drift from the 300-foot station at the E. Porter Gold King has been drifted on for 50 feet and the character of the ore seems to establish that the vein is the same one found in the Anchoria-Leland ground as was believed when the strike was first made.

The Geneva on Gold hill is producing about 50 tons of $40 ore a week. Tutt & Penrose, the lessees, have done about all the dead work their lease calls for, and in a short time will put all the men on ore.

T. L. Cotton has taken a $15,000 bond and lease for eighteen months on the Magdalene on Gold hill from Nathan & Co.

The 400-foot level on the Moon-Anchor on Gold Hill, has penetrated the ore chute for a distance of 40 feet, and finds the ore in that level to be fully six feet in width, the grade averaging $60 and sorted into two grades.

The adit tunnel on the May Belle lease on the Lawrence townsite has progressed 20 feet into the new ore chute entered a few days ago and values continue. Some ore is now being sorted into two grades, estimated to run $200 for the first and about $40 for the second.

Dolf, Odell & Mohrbacker have taken a bond for $20,000 and lease for one year on the Electric, located in the saddle between Gold and Globe hills.

The London and Colorado Gold Mining and Exploration Company organized under the laws of the State of Colorado, with main offices in London, has secured leases and claims in Gilpin, Clear Creek, Lake and El Paso counties, and orders have been received from London directing the agent of the company in Colorado to send a force of men to Cripple Creek, where the company has secured from the Queen Victoria Mining Company sub-leases on two lots in the school section in Grassy gulch, which they propose to develop.

NEW MEXICO.

Silver City *Enterprise*: About twenty men are employed in the mines of Chloride Flat. Several men at work screening the old dumps and fully 1,000 tons of ore has been produced from this source during the past three months.

At Pinos Altos on the Talcose group of mines, formerly owned by Wm. Dorsey, fourteen men are at work.

The Golden Giant Mining Company have about fifty men employed in the mine and mill. The ore in this vein appears to increase both in quantity and quality as depth is attained.

The Bayard Mining and Smelting Company which purchased the Texas and other mining properties at Central, have paid the first installment of the purchased price. The new management has taken charge and men are at work.

At Santa Rita twenty men are employed in the mines of the camp, mostly as leasers, producing copper ore which is being shipped to the reduction works.

Weatherby & Banks have recently given a two years lease and bond on the Florid group of mines to Mr. Bell of Chicago who is said to represent a strong syndicate of English and American capital.

ARIZONA.

Yuma *Sentinel*: R. M. Strauss, superintendent of the La Fortuna mine, came in Sunday with $75,000, the result of a six weeks run.

It is rumored that a French syndicate will shortly purchase the La Fortuna mine for $1,500,000.

Nogales *Oasis*: The quality of coal found on the San Carlos coal fields is said to be excellent. The only question now to be determined is the extent of the vein.

The ten tons of ore from the McMahon lease on the Nighthawk gave a return at the sampler of nearly 7000 ounces silver and 20 ounces gold.

A new reduction plant is to be erected at Fool's Gulch, Yavapai county, by the company operating the Planet-Saturn mines. It will consist of Cornish rolls and a cyanide tank.

F. R. Nellis and a force of men will soon leave for the copper mines six miles from Rain Tanks. These mines are owned by a syndicate of Williams business men. The ore runs from 20 to 70 per cent copper.

Mojave *Miner*: There are eighteen men at work on the Elkhart mine at Chloride for the Improvement Company. In the level from the 140-foot station a big body of lead ore has been encountered.

The strike reported in the Metallic Accident is improving daily. The find is in the old workings near where the rich body was taken out twenty years ago by the late Thomas J. Christie.

SOUTH AFRICA.

South African *Mining Journal*: That the onward progress of these fields is not to be lightly stayed has been demonstrated in the plainest manner by the output for July, which was on Monday last declared at 203,874 ozs., which is the highest on record, overtopping the August record of last year by 301 ozs., the total for that month having been 203,573 ozs. This result has, it may be roundly asserted, been gained by the sheer extra weight of working stamps, which, in spite of all troubles, have been steadily added to the list; for, as compared with the conditions which prevailed at this time last year, the mines just now are working at a distinct disadvantage, and especially so in the matter of the coal supply, which on many properties has given more trouble during the past month than during any other preceding period. Thus, comparing the month's run with that of August of last year, the average running time for that month was 28.18 days, while for this July the average running time for the mines sending returns to the Chamber was only 27 65 days, and for the Association it was even less—26.30 days—these low figures being mainly due to the coal difficulty. This short running time is, however, balanced by the fact that, whereas in August of last year the number of stamps was 2565, for this July the total has been 3060.

The value of the gold from the 34 companies adhering to the Chamber is £580,080, and from the 11 companies adhering to the Association £116,616, giving a gross value for the output of £696,696, or at the rate of over £8,000,000 per annum. The duty per stamp per day for the 2365 stamps of the Chamber return was 4.38 tons and for the 695 stamps of the Association 4 tons.

The position of the leading companies as regards the value of their output is as follows:

		July.	*June.*
1.	Robinson	£57,401	£63,620
2.	Ferreira	39,478	39,103
3.	Crown Reef	36,928	35,755
4.	New Primrose	36,669	33,994
5.	City and Suburban	31,902	29,276
6.	Simmer and Jack	30,915	28,491
7.	Langlaagte Estate	26,500	28,300
8.	Geldenhuis Estate	23,077	22,406
9.	Henry Nourse	23,695	22,883
10.	New Heriot	20,705	20,701

It is pleasant to note that the Geldenhuis Deep is beginning to run close up to this list, and in all probability another three or four months will give it a place on the table of the leading mines. The value of its yield for July is returned at £17,473—a large increase over that for June.

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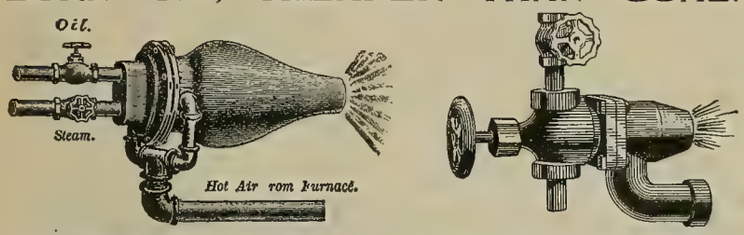

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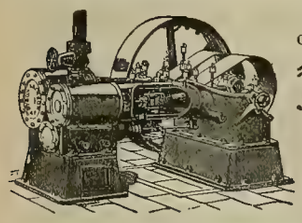

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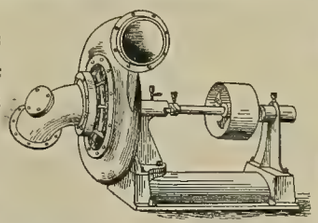

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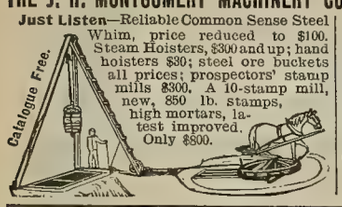

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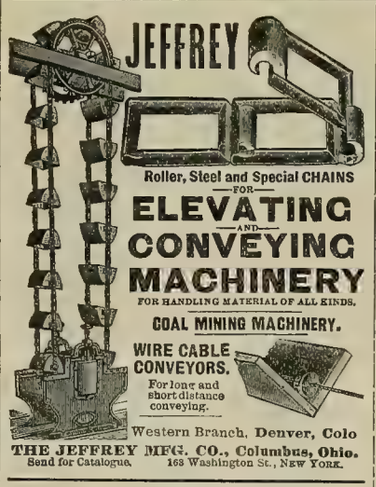

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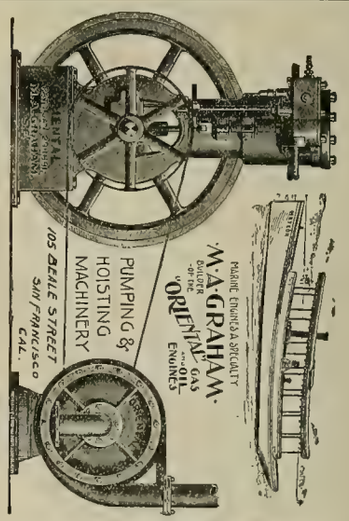
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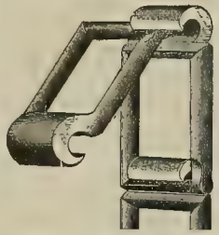

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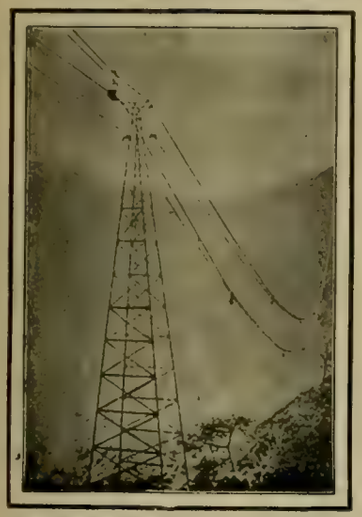

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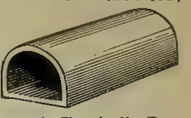

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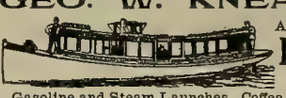

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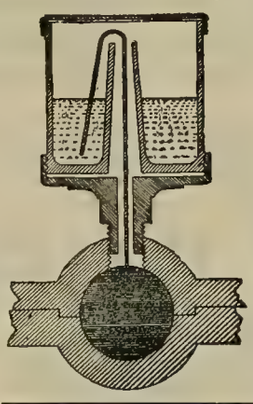

THE FINCH OIL CUP.
Frictional vibration by the motion of the shaft against the point of the wire causes the oil to flow, and that this flow is not produced simply by syphonic or capillary action but by frictional vibration is proven by the fact that if the wire does not rest on the shaft then the oil will not flow. When the machinery stops the feed stops, therefore **the Finch Cup is Absolutely Automatic, Feeds Enough Oil and No More, Prevents All Waste, Needs Very Little Attention.**

Read One of the Many Testimonials:

UNION GAS ENGINE CO. SAN FRANCISCO, July 19, 1894.
During the past three years we have used your Cups for the crank shaft bearings of our engines, and also on all bearings of shaftings and tools in the shop. Our engines now *require no attention* except to fill the Cups occasionally, and therefore we can cheerfully recommend the Finch Cups to any one as *being the best in the market.*

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General Agent for Pacific Coast. Send for Circular.

HORACE F. BROWN, CONSULTING ENGINEER.

Special attention given to preparing plans for the Chlorination and Bromine Processes of Treating Gold Ores.

PATENTEE { **Brown's Complete Automatic Mill Process.**
Brown's System of Mechanically Stirred Roasting, Cooling and Conveying Furnaces, Etc.

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THE KENDALL PROCESS is the most efficient method of using cyanide for the extraction of precious metals from their ores. Wherever this process has been adopted the result has been increased percentages of values recovered and saving of time. Material reduction in consumption of chemical has also been demonstrated with respect to several classes of ores.

All ores, without exception, amenable to cyanide treatment can be treated to better advantage by the Kendall Process. This can be accepted as an axiom.

The Kendall system of gold and silver milling comprises (1) the Extraction Process, in which the chemical solution extracts the values from ores; (2) the Recovery Process, by which the gold and silver are obtained from the solution, and (3) a modified form of plant, not indispensable, but permitting the use of unskilled labor.

Owners of mines and reduction works can obtain full information on application to
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The General Gold Extracting Co., Ltd.,
PELATAN-CLERICI PROCESS.
Patented in U. S. and Other Countries. Capital, £100,000.
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This process has a well-demonstrated merit in treatment of low-grade Gold and Silver Ores, especially those of a complex character, talcose and clayey combinations or slimes, which class of ore, as is well known, cannot be treated by leaching or lixiviation.

Gold and silver values, both fine and coarse particles, are by the PELATAN-CLERICI PROCESS recovered direct from ore without roasting as pure amalgam, and the precious metals are saved in the form of fine bullion without any refining costs.

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Adapted to all Heads from
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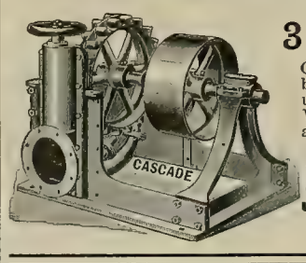

Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

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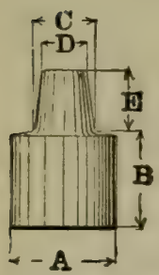

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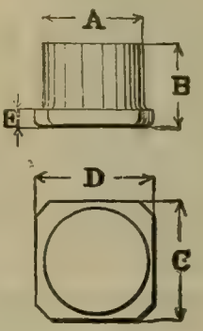
B=..... "
C=..... "
D=..... "
E=..... "

We beg to call attention to our "RISDON HAMMERED" Shoes and Dies, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



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DETACHABLE BUCKET WIRE-ROPE TRAMWAYS,

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Improved Self-Contained Cushion-Frame Five-Stamp Mill.
Patented in the United States and Foreign Countries.

The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Setf-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill.

FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.

SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.

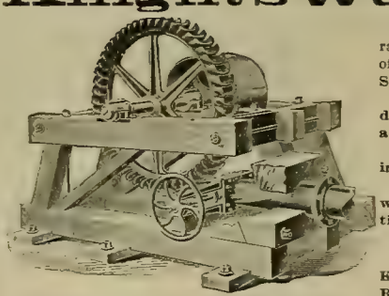
THIRD: The Large Amount of Space Saved.

Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.

Send for Catalogue and Price List.~

~CORRESPONDENCE SOLICITED.

Knight's Water Wheel.



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The accompanying cut shows the general arrangement of Knight's Standard Water Wheel, of which there are hundreds in use in different States of the Union.

These Wheels are made from 2 feet to 6 feet in diameter, from 10 to 1000-horse power, and adapted to all heads and purposes.

Wheels inclosed in iron cases, from 6 to 24 inches.

Wheels for electrical power can be furnished with or without Governors. Highest regulation guaranteed.

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Mining Pipe

For Hydraulic Purposes, made from the Best Sheet Steel, Single or Double Riveted, Dipped or Undipped.

We will ship Pipe cut and punched, to be riveted at the mine, making a saving in freight charges.

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SHEET IRON WORK OF ALL KINDS.
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No dust. No ashes. Cheap, effective, economical, portable and automatic.

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Factory: Novato, Marin Co. California.

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Main Office: No. 330 Pine Street San Francisco.

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Iron cut, punched and formed, for making pipe on ground where required. All kinds of Tools supplied for making Pipe. Estimates given when required. Are prepared or coating all sizes of Pipes with Asphaltum.

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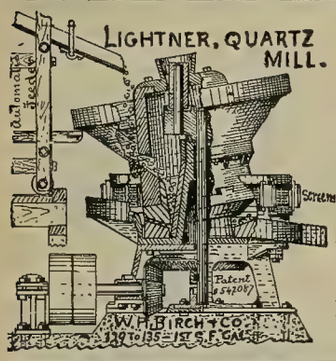

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2-Stamp Batteries, Self-Contained.
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BRODIE'S ROCK CRUSHERS, SAFETY CAGES, MINING HOISTS, ORE CARS and BUCKETS.

All kinds of Mining Machinery.

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Stamp Mills

Of the Latest Improved Design for

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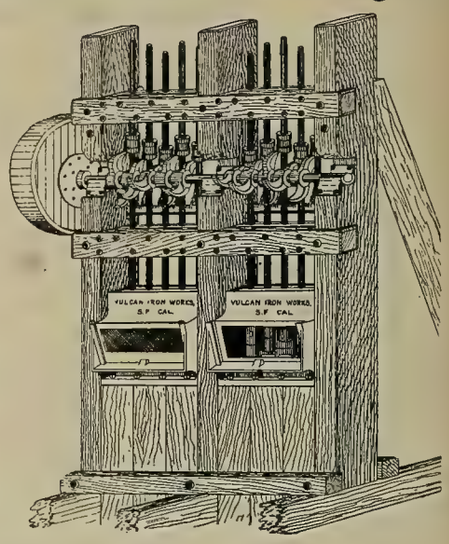

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Vulcan Iron Works,
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250 Square Feet, with Nails and Paint Complete.....$4.00

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TWENTY-SEVEN YEARS' CONTINUOUS SERVICE in the great Mines, Steamships, Railroads and Mills all over the world prove it to be

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ADAMANTINE SHOES AND DIES

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CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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WE ARE MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR **Gold, Silver, Lead, Copper and Pyritic SMELTING FURNACES.**

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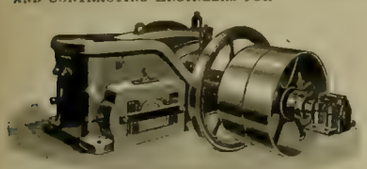
Investigate Our Late Improvements in ORE CRUSHING MACHINERY.
We Guarantee Capacity Per Day to Any Degree of Fineness. . . . . .



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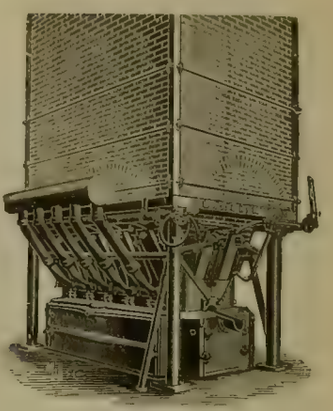
OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

CONSOLIDATED Kansas City Smelting and Refining Co.

Incorporated Under The Laws of New York.

Capital paid in.....$2,700,000.

Buyers of All Classes of

GOLD, SILVER, LEAD AND COPPER ORES,

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GOLD BARS, SILVER BARS and MILL PRODUCTS.

SMELTING WORKS:
Argentine, Kas.; El Paso, Tex.; Leadville, Colo.

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We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Moreing & Neal's Code and Bedford McNeill's Code.

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Cheaper Than Cast Iron.

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RIX COMPRESSED AIR MACHINERY COMPANY,

11 AND 13 FIRST STREET, SAN FRANCISCO, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 24, 1896.

The demand for winter stocks is steadily enlarging. In the gold mining districts the purchases are reported to be larger than at the corresponding time in 1895. This increase is due to more miners at work. From the lumbering camps and most of the agricultural sections the call does not show any material change. An improvement in the market value of wheat has created a better feeling, which would be more in evidence were it not for the fear that prices have been advanced largely on a speculative bull move on short sellers. While this may, to some extent, be the case, yet the statistical situation of the cereal the world over is favorable to better prices throughout the current season than have obtained for several seasons. With farmers doing better and a continued boom in mining, this coast ought to be entering on a more prosperous season.

The securing of a contract to build a battleship in this city, with an almost certainty that the building of one of the cruisers will be awarded to San Francisco, ought to have a good effect. Added to this there is a strong probability that one or more of the large iron steamships to be built by the Japanese company, to ply between this port and Japan, will be built here. The financial agent of the company has been here looking over the field, then went East and is now in Europe. The New York *Journal of Commerce*, commenting on his movements, thinks that San Francisco will be awarded at least one of the vessels, the East get one or more, and England the others.

In the local money market the available supply of funds is steadily increasing, but the banks are slow in putting it out except on gilt-edge security on call or short time. The impression is growing that soon after the Presidential election this will change and lenders will be seeking borrowers. Those who have drawn their funds from banks for hoarding will tire of having idle money, and will therefore seek investment. The banks are holding large quantities of gold coin brought from the East. Aside from this, it is said they can again get coin from the sub-Treasury in this city, so they are resting easy. The Eastern markets are working easier under continued heavy importations of gold from Europe. This influx is chiefly to meet commercial bills drawn against shipments of cotton, wheat and other American products. The balance of trade is largely in this favor; and as European investors are not selling our securities, it is not at all unlikely that the flow of gold to this country will continue for some time to come, which means better times in this country. As yet, there is an absence of a general speculative movement. The European markets are working closer, with the rates of interest advancing and premiums on gold enhancing.

New York Silver Prices.

NEW YORK, Sept. 24.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	30 7-16	65⅞
Saturday	30⅝	65⅝
Monday	30¾	65¼
Tuesday	30⅜	65⅜
Wednesday	30½	65½
Thursday	30⅜	65½

	Copper.	Lead.	Iron.	Tin.
Friday	10 75	2 77½	10 25@12 50	13 00
Saturday	10 70	2 77½	10 25@12 50	13 00
Monday	10 70	2 77½	10 25@12 50	12 95
Tuesday	10 70	2 77½	10 25@12 50	12 95
Wednesday	10 75	2 80	10 25@12 50	12 90

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	10
New York Telegraphic Transfer	15
London Bankers' 60 days	$4.83
London Merchants	$4.82
London Sight Bankers	$4.85
Refined Silver, per oz., 1000 fine	65¾
Mexican Dollars	51@51½

SILVER.—The market sold down up to Tuesday, when it began to firm up. There is a fair export movement from New York to Europe. The European markets are reported more or less dull, with a continued light movement to India, the Straits and the Orient. Light as is the call, still stocks in this country and abroad are said to be slowly decreasing. Our European exchanges report that dealers are watching with keen interest the election campaign in the United States, which they think will have quite a direct bearing on the market value of the white metal. The miners' strike at Leadville will, it is thought, curtail the production in this country. In our market very little business is reported.

MEXICAN DOLLARS.—The market is devoid of interest in the absence of much of an inquiry. Quotations are largely nominal.

COPPER.—The market has held steady both in this country and Europe. For the seven months ending with July the imports into the United States were as follows: Ore and regulus, tons, 1895, 8,070; 1896, 1,415. Pigs, bars, ingots, etc., pounds, 1895, 2,906,012; 1896, 6,474,696. The export of copper during the same period were in 1895, 78,110,642 pounds and in 1896, 142,476,307 pounds. James Lewis & Son, under date at Liverpool, Sept. 1st, report: "Manufactured copper has been in much request. Electric lighting and traction is rapidly extending. The telegraph department of the post office have contracted for about 700 tons of high conductivity wire, and have laid two telegraph wires of copper between Glasgow and London for the more rapid transmission of messages. For locomotive plates and tubes manufacturers are full of orders up to the end of the year. It is stated that one of the chief locomotive engineering firms in Scotland have orders booked that will fully occupy them for eighteen months. American producers have displayed great anxiety to sell their copper, especially electrolytic. Advantage has been taken of this by both English and Continental consumers to secure considerable quantities at very low prices."

The market is quoted as follows:

Ingot, jobbing	—	@	14
Ingot, wholesale	—	@	13
Sheet copper	—	@	17

LEAD.—The market is steady, with the stocks in this country being steadily depleted. For the seven months ending July 31st the imports into the United States were in 1895, 105,097,393 lbs., and in 1896, 94,732,086 lbs. The export movements during the like time were as follows:

	1896.	1895.
Foreign produce, lbs	53,757,375	16,132,145
Domestic produce, lbs	8,206,950	884,593

Our market is quoted as follows:

Pig	—	@	3 65
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

ANTIMONY.—The demand is fair, with the market steady at 7¾@8¼c in a jobbing way. New York mail advices quote 7⅜ for Cookson's, 6⅝c for Hallett's and 6¼c for Japanese, from store.

BORAX.—There is a continued free shipment.

The market is quoted as follows:

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	5¼
Concentrated, "	5⅝

QUICKSILVER.—The last steamer for Central America took out 100 flasks for Mexico.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

SHOT.—There is a continued good trade call.

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—With the silver market still low, pig tin is weak. The demand is light. Eastern and European advices report inactive markets.

The market is quoted nominally as follows in jobbing lots:

Pig, per lb			14
Plate, I C coke, heavy, per box	$4 10@		—
" " light, "	4 00@		—

POWDER.—The market is practically unchanged.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, "	8¼c

IRON.—The consumption is fair, with the market steady. The East is reported steady at unchanged quotations.

COAL.—The consumption of all kinds is enlarging, but the market is easy.

COKE.—The market is quoted as follows:

Gas Companies'	—	—	— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

Mining Share Market.

SAN FRANCISCO, Sept. 24, 1896.

The market the past week has been dull and heavy, with very little trading. It has acted very much as if a few brokers and outside operators have combined for a small upmove, for there is nothing as yet on the surface to warrant asserting that insiders are in the market. When the latter come in, they make lively moves, and do not, apparently, care whether the general public is short or long; but broker outside operators' move to higher prices is always done after the general public has been largely frozen out of its holdings, and when the work in one or two of the mines is nearing an interesting point which will admit of ore strikes so as to sell on a bulge in prices. The work on the Brunswick lode will, before the middle of next week, reach a point where it is expected the downward continuation of the ore found above will be struck. Of course, this can be enlarged or made small, whichever suits the pool's purpose the best. Then there is another factor which can be brought into play, and doubtless will before the end of October—the Congressional and Senatorial election racket. In years gone by this was used quite successfully to promote higher prices for mining shares before election and lower prices with a drag afterwards. This year it may not be used until after November 3d, for, practically, so far as a deal is concerned, it makes very little, if any, difference who is elected President of the United States. If these premises are correct, then outsiders who have not been frozen out will have an opportunity before the year is over of getting out at an advance on present prices; but when higher prices come, and they hold too long, they are liable to miss it again, for, as stated above, everything points to the market being manipulated by a pool composed of a few brokers and a few outside operators, and these are content with a small deal. The shares of the Bodie mines have had quite a firm tone. They act as if better prices will rule soon.

Official advices from the Comstock mines are practically unchanged and uninteresting, but what is considered reliable information points to more active work at an early day in the Gold Hill and north end groups, probably in the former for election purposes and in the latter to exploit some new ground, which may contain considerable ore, although there are as yet no indications of it. In the Alta group work is only reported in Alta, and, singularly, since the assessment the official letters have been very dry reading. Perhaps this may change after discouraged shareholders sell out. In the Gold Hill group a few tons of ore are raised each week by Overman while doing some exploiting work. Seg. Belcher and Belcher continue to raise some ore, but from what level the letters are silent. The latter company is milling nearly 500 tons of fair-grade ore. The battery assays average a little over $20 a ton. The Crown Point letter indicates they are preparing for more active exploiting work and also the extracting of increased quantities of ore, which ought to favorably affect the market at that end. From Kentuck and Yellow Jacket nothing reliable is obtainable. Confidence is raising a few tons of ore, but nothing is reported in the Challenge's letter. Perhaps, after the pending 10-cent assessment, something of interest may be made public. In Con. Imperial the joint Challenge, Confidence and Con. Imperial crossdrift is being driven ahead. Experienced miners look for quite an improvement in it before long, particularly if the public have sold largely of their holdings. Work in the other crossdrift is being pushed ahead. Both of these crossdrifts are being closely watched by well-informed miners, who look for quite a strike, unless the work is stopped before long. In Alpha they are still working on the 500-foot level. They have not rediscovered the ore found several years ago, which caused the shares to sell considerably over $2 a share; perhaps the latter are not sufficiently concentrated yet. Work in the Bullion long crosscut is continued. This work, if pushed far enough to the west, ought to strike some high-grade ore. In Potosi they are at work on 450-foot level. They have also commenced running west on the "croppings." In Chollar there is no material change in the work. The number of tons raised is steadily decreasing. The work in Hale & Norcross towards Savage attracts attention. It may be that this is all that will come out of it. This company seems to be economically managed and run in the interest of shareholders. The Savage letter is shorter, but contains nothing of much interest. From Gould & Curry and Best & Belcher there is nothing new to report and none looked for soon. In Con. Virginia it is expected that the east crossdrift near the Best & Belcher, from which many looked for great things, will be discontinued soon and another started some distance further north. They will thoroughly exploit the 1000-foot level in the west in the hope of finding ore. The superintendent is following every stringer encountered, with the hope of its leading up to a body of ore. From the 1750-foot level ore continues to be raised each week, but not in sufficient quantity to meet expenses. In Ophir they are exploiting on the 1000-foot and Central tunnel levels. From Mexican, Sierra Nevada and Union the news is about the same as heretofore reported in this department.

The work on the Brunswick lode continues the center of attraction, particularly that on the 400-foot Hale & Norcross shaft level going south. The drift has not been driven as fast as was that on the 300-foot level, and consequently the downward continuation of the ore found on the 300-foot level is not expected to be struck until towards the middle of next week. Mining men are confident that there will be a decided improvement in the quantity and grade. Occidental is extracting and milling low-grade ore. The winze that is being sunk below the 750-foot level is not so favorable. Active work is being done in Hale & Norcross, Savage and Gould & Curry. The Best & Belcher and Con. Virginia shaft is being slowly sunk.

From the Bodie district our advices are about the same as reported last week. Active work is reported by Bulwer, Standard and Bodie, with ore raised and milled each week. In Mono they are still running the drift from the Bodie 400-foot level for the Fortuna lode.

The market opened strong and higher this morning under the lead of Confidence and Challenge. After Call business was slack for a while, but soon revived, with Confidence selling up to $1.55 and Challenge to 55 cents. The remainder of the list strengthened slightly in sympathy. Towards noon there was a bear raid, which weakened prices off under fair trading. At the 2:30 session business was light. Slow progress is being made in the Hale & Norcross-Chollar south drift on the 400-foot level, Brunswick lode, owing to soft ground. The impression prevails with operators that there will be nothing in the market until after election, outside of a few spasmodic up-moves which will be hard for outsiders to catch. Whether this will prove correct, the writer has no way of verifying. It looks very much as if it all depends on what will be found in the south drift on the Hale & Norcross-Chollar 400-foot level, Brunswick lode. Mining men are confident of good results. Yet there are those who have very little faith in the proposition turning out anything very substantial, and, if so, prices for shares on that lode, they think, are too high.

The following illustrates the changes of the week:

Mines.	Sept. 17.	Sept. 24.
Alpha	$ 17	.....
Alta Consolidated	.....	.....
Andes	.....	.....
Belcher	52	$ 54
Best & Belcher	1 00	94
Bodie	63	65
Bullion	19	21
Challenge	.....	55
Chollar	2 35	.....
Confidence	1 35	1 40
Consolidated California and Virginia	1 80	1 75
Consolidated New York	.....	.....
Crown Point	30	51
Exchequer	.....	04
Gould & Curry	56	52
Hale & Norcross	1 50	.....
Justice	05	.....
Mexican	.....	49
Ophir	99	95
Overman	15	.....
Potosi	.....	86
Savage	.....	60
Sierra Nevada	75	70
Union	42	36
Utah	.....	.....
Yellow Jacket	33	34

San Francisco Stock Board Sales.

SAN FRANCISCO, September 24, 1896.

9:30 A. M. SESSION.

50 Belcher	54	1000 Con Imperial	02
200 Best & Belcher	94	100 Crown Point	51
200 Bodie	65	300 Gould & Curry	52
400 Bullion	21	100 Ophir	95
200 Bulwer	44	50 Savage	60
450 Challenge	55	500 Seg Belcher	08
600 Con Cal & Va	1 75	200 Sierra Nevada	70
150 Confidence	1 40	1250 Yellow Jacket	34

SECOND SESSION—2:30 P. M.

100 Ophir	94	100 Con Cal & Va	1 70
200 Mexican	49	100 Exchequer	04
350 Best & Belcher	91	50 Union	36
200 Potosi	86	400 Bullion	20
100 Crown Point	49	100 Challenge	50
50 Confidence	1 40	300 Occidental	46
100 Sierra Nevada	70	100 Bodie	63

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.		Secretary.
Alpha Con M & M Co, Nev	17	10c	Aug 3.	Sept 7.	Sept 29	C E Elliott, 309 Montgomery
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24.	Sept 24.	Oct 24	E D Farish, 632 Market
Bay State M & D Co, Cal	33	3c	Aug 21.	Sept 30.	Oct 20	F E Luty, 330 Pine
Bullion Mining Co, Nev	42	10c	Aug 14.	Sept 15.	Oct 8	R R Grayson, 331 Pine
Belcher S M Co, Nev	53	25c	Aug 5.	Sept 10.	Sept 30	C L Perkins, Mills Building
Central Eureka	3	2c	Sept 3.	Oct 10.	Nov 2.	Wm A M Van Bokkelen, 320 Sansome
Channel Bend M Co	4	2c	Sept 14.	Oct 16.	Nov 7	J P Langhorne, 39 Sutter
Crown Point M Co, Nev	68	20c	Aug 18.	Sept 23.	Oct 13	J Newlands, Mills Building
De Soto G M Co	1	7c	Sept 7.	Oct 10.	Nov 9	E H Clark, Mills Bldg
Goleta M Co	4	20c	Sept 21.	Nov 2.	Dec 2	D M Kent, 330 Pine
Quaker G M Co	40	12c	Sept 7.	Oct 8.	Nov 5	C W Poindexter, 418-420 Market
Gould & Curry S M Co, Nev	79	15c	Sept 1.	Oct 5.	Oct 27	A K Durbrow, 309 Montgomery
Jamison M Co, Cal	8	5c	July 6.	Sept 7.	Sept 28	Sam W Cheyney, 120 Sutter
Marguerite G M & M Co	4	30c	Sept 21.	Nov 10.	Dec 15	Chas Peach, 237 12th
Montecito M Co	3	15c	Sept 21.	Nov 2.	Dec 2	D M Kent, 330 Pine
Occidental Con M Co, Nev	24	10c	Sept 2.	Oct 8.	Oct 29	A K Durbrow, 309 Montgomery
Reward G M Co, Cal	1	3c	Aug 8.	Sept 14.	Oct 5	J Stadtfeld, 309 Montgomery
Sierra S M Co, Nev	111	25c	Aug 7.	Sept 11.	Oct 1	E L Parker, 309 Montgomery
Sterling M Co	3	15c	Sept 21.	Nov 2.	Dec 2	D M Kent, 330 Pine
Sumdum Chief M Co	1	15c	Sept 2.	Oct 19.	Nov 5	H G Stevenson, Hobart Bldg
Troy M & Dev Co	1	12½c	Sept 7.	Oct 14.	Nov 7	Otto Ryst, 525 Front
Union Con S M Co, Nev	53	20c	Aug 25.	Sept 28.	Oct 22	A P Swain, 309 Montgomery
Utah Con M Co	23	5c	Sept 10.	Oct 13.	Nov 2	A W Havens, Nevada Block
Yellow Jacket S M Co	61	25c	Sept 11.	Oct 15.	Nov 20	W H Blauvelt, Mills Bldg

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Anchor Coal and Development Co	E D Farish, 632 Market	Oct 20

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THE offices of the Colliery Engineer Company, proprietors of *The Colliery Engineer and Metal Miner*, *Home Study* and the International Correspondence Schools, at Scranton, Pa., were partially destroyed by fire August 30th. Their business, however, was slightly interfered with and the journals were out within a few days of the usual time.

Assessment Notices.

ANCHOR COAL AND DEVELOPMENT COMPANY Location of principal place of business, San Francisco, California; location of works, Kelso, Cowlitz county, Washington.

Notice is hereby given that at a meeting of the Board of Directors held on the 24th day of August, 1896, an assessment (No. 7) of Three Cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market Street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-fourth (24th) day of September, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the twenty-fourth (24th) day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. D. FARISH, Secretary.

Office—No. 632 Market Street, Room 5, San Francisco, California.

GOLDA CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the first day of September, 1896, an assessment (No. 79) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the fifth (5th) day of October, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 27th day of October, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69 Nevada Block, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 2d day of September, 1896, an assessment (No. 24) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of October, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 29th day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer county.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-first (21) day of September, 1896, an assessment (No. 4) of twenty (20) cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 237 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on TUESDAY, December 15, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. PEACH, Secretary.

Office—237 12th street, San Francisco, Cal. Office hours from 4 to 6 o'clock P. M.

ANNUAL MEETING.—The Annual Meeting of the stockholders of the Anchor Coal and Development Company will be held at the office of the Company, No. 632 Market St., room 5, San Francisco, California, on TUESDAY, the 20th day of October, 1896, at 1 o'clock P. M., for the purpose of electing a Board of Directors for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, October 17th, at 12 o'clock M.

E. D. FARISH, Secretary.

Office—Room 5, No. 632 Market street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, HAVING received applications to mine by the hydraulic process from Larsen & Harris, in the Larsen mine, near Placerville, El Dorado Co., to deposit tailings in North Canyon; from A. F. Sheehan, in the Blue Eyes Mine, in Duncan Canyon, Placer Co., to deposit tailings in a dry ravine; from the Plymouth Consolidated Gold Mining Co., in the Bell & Dorsey Mine, at Indian Diggings, El Dorado Co., to deposit tailings in Indian Diggings Creek and Scott Creek; from E. A. Wiltsee, in the Gold Run Mine, at Gold Run, Placer Co., to deposit tailings in Canyon Creek; and from H. Spaulding to work in the Craycroft Mine, near Downieville, Sierra Co., to deposit tailings in Hughes' Ravine, gives notice that a meeting will be held at Room 69, Flood Building, San Francisco, Cal., on October 12, 1896, at 1:30 P. M.

SITUATION WANTED by an experienced amalgamator and millman who thoroughly understands his business. References furnished. Address ALEX. H. FORMAN, this office.

DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock on account of assessment (No. 4) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows

Names.	No. Cert.	No. Shares.	Amt.
E. C. Cain	170	2,500	50 00
E. C. Cain	171	2,500	50 00
C. L. Dingley, Jr.	72	800	16 00
C. L. Dingley, Jr.	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	169	3,803	76 06
E. C. Godfrey, Trustee	160	6,977	139 54
E. C. Godfrey, Trustee	166	1,333	26 64
E. C. Godfrey, Trustee	167	1,849	36 98
E. C. Godfrey, Trustee	141	1,967	39 34
E. C. Godfrey, Trustee	142	3,000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	81	2,000	40 00
J. F. R. Landis	138	1,000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6,000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2,500	50 00
Jos. A. Pratt	2	2,500	50 00
Jos. A. Pratt	3	2,500	50 00
Jos. A. Pratt	54	2,500	50 00
John E. Todd	5	2,500	50 00
John E. Todd	6	2,500	50 00
John E. Todd	9	2,500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896 so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until WEDNESDAY, October 21st, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California.

E. C. GODFREY, Secretary.

DELINQUENT SALE NOTICE.

THE JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, on Jamison Creek, near Johnsville, Plumas County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 8) levied on the Sixth (6th) day of July, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
A. Hall	112	2 000	100 00
John Sparks	164	1.000	50 00
John Sparks	165	1.000	50 00
John Sparks	166	2.000	100 00
John Sparks	167	1.000	50 00
John Sparks	168	1.000	50 00
John Sparks	169	500	25 00
John Sparks	216	500	25 00
Al. White	236	500	25 00

And in accordance with law, and an order from the Board of Directors, made on the 22nd day of July, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room 50, 120 Sutter St., San Francisco, California, on MONDAY, the 28th day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

SAM W. CHEYNEY, Secretary.

Office, Room 50, 120 Sutter Street, San Francisco, California.

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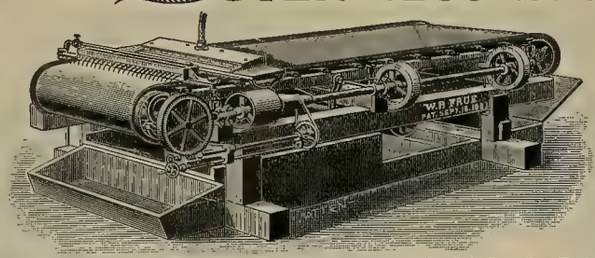

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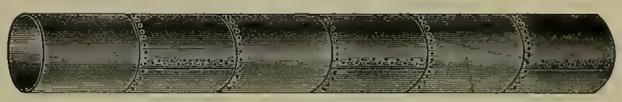

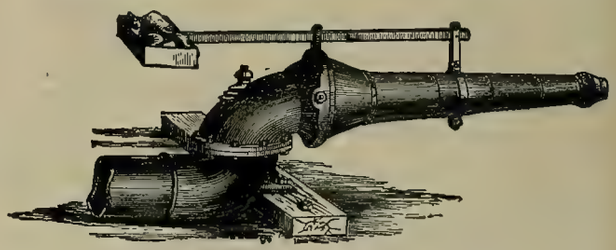

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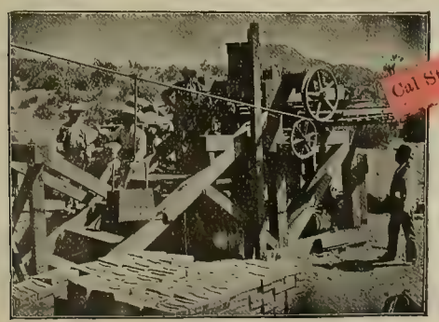

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No. 1891.—VOLUME LXXIII. Number 14. SAN FRANCISCO, SATURDAY, OCTOBER 3, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Oil as Fuel in California.

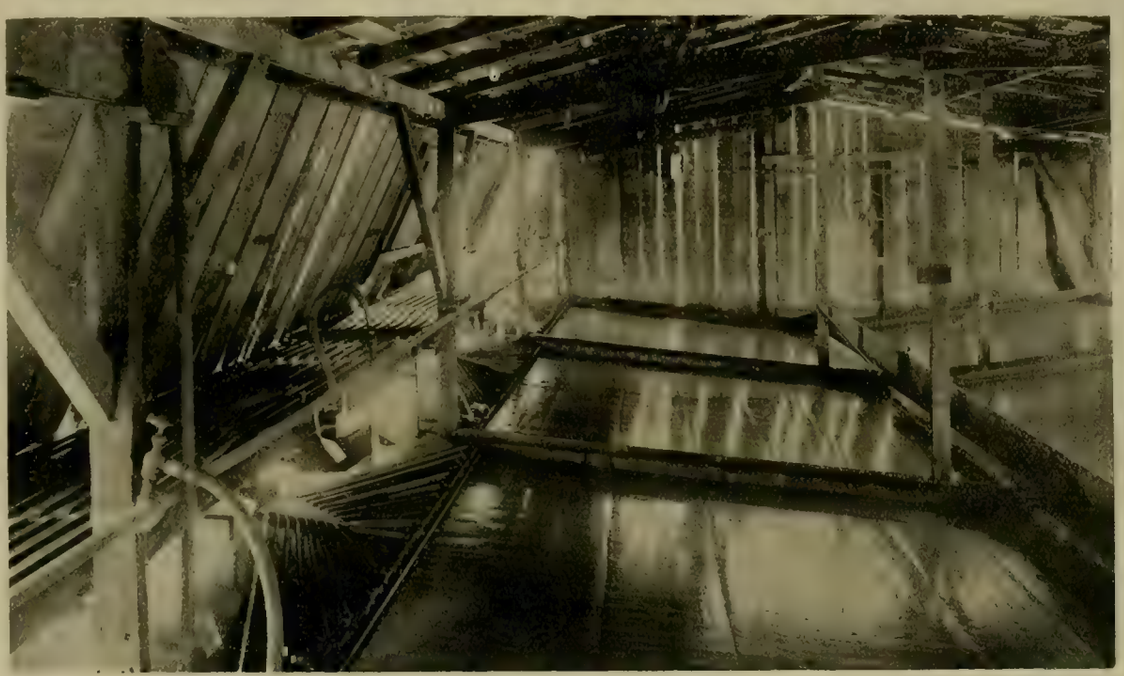
The use of oil as a fuel has been largely increased on the Pacific coast, and especially in California, during the past two years. Of course, the main reason for this is the opening up of the oil wells in the southern part of the State and the marketing of the product at prices that make it cheaper for that purpose than coal. The supply is now large and it promises to be very much increased in the near future. Prospecting wells are being sunk in many parts of the State which promise to add, in time, considerably to the present output.

The fuel question has been a very serious one in parts of California, especially south of Tehachapi, and in the interior, where there is little water power to be obtained, where there is little timber for fuel, and where the freight rates upon coal from delivery points on the coast more than double the cost at those points. Nature seems to have provided, however, in all that part of the State, oil wells in comparatively close proximity to the mines to make up for her niggardliness in other respects.

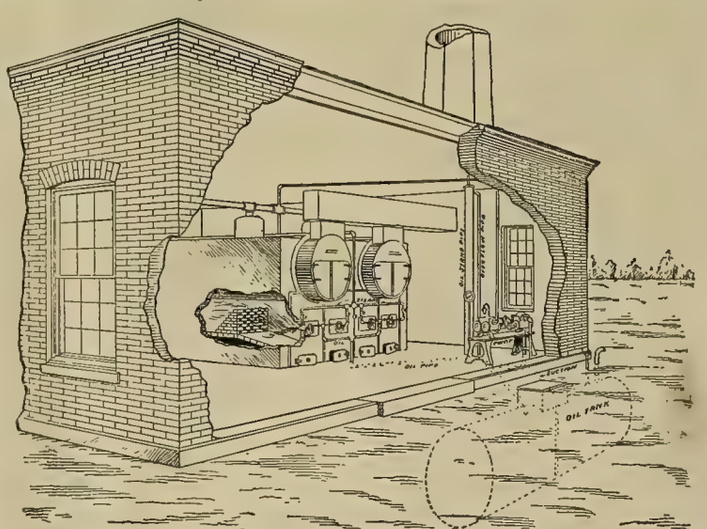
There are many places in southern California where the freight from tide water upon coal by rail is greater per ton than the cost of the coal itself. About three barrels of oil, each of forty-two gallons capacity, is equal for heating purposes to one ton of coal, and it is easy to calculate that the former may be supplied in many different parts of California for a small part of what would be the cost of the latter.

There are over 40,000 oil wells in the United States, with an output of about 200,000 barrels per day. A large proportion of this has been used for fuel, and has been for a number of years. As a result of the introduction of oil for fuel purposes there has been a great deal of activity in the way of inventions for the economical use of the crude oil for generating steam.

We illustrate on this page the Thurman oil burner as applied to boilers. It will be seen that the storage tank is placed underground and outside of the building, and has a supply inlet and a vent pipe. The oil pump is located in the boiler room and pumps the oil from the tank into the stand pipe, which is located near the pump. The oil flows by gravity pressure from this pipe to the burners, where it is atomized by a supply of steam from the boiler. The stand pipe has an overflow pipe back into the tank, which prevents the stand pipe from overflowing, thus keeping a regular oil pressure. The proportion of oil and steam is regulated to any degree at will by the valves located near the burners.



THE GATES CANVAS PLANT AT THE KENNEDY MINE. (*See page 277.*)



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The steam pressure thoroughly atomizes the oil, and the oil atoms intimately commingle with the hot air atoms from the furnace through a pipe, and pass from the mouth of the burner in a highly combustible and vaporous form, thus making pure hydro-carbon gas, which burns like a gas flame with perfect combustion.

Pullman Cars and Investors.

The advantage of railways to mining districts and the effect on investments in those districts by outside capital is well illustrated in California. The average investor does not care to go beyond where he may ride in a Pullman car. It is for this reason that into counties like Sierra, Plumas and Siskiyou, where there are offered splendid inducements for mining investments, very little outside capital goes. It is hardly necessary, in order to show that these counties are exceedingly rich in minerals, to more than point out the fact that without aid of outside capital and simply through the efforts of their own citizens, generally working on very small scales, they rank very high in the list of gold producers of the State. In Sierra county, for instance, there have been some of the largest and richest mines ever operated in California. Yet the opening up of these mines, simply on account of the inaccessibility of the district, has not done much to attract capital to seek others. Easy communication between this city and Sierra county by rail, or Plumas county, or the western part of Siskiyou, would immediately attract the attention of investors.

One is apt to think that the cost of supplies, and consequently the cost of working the mines in these districts, is much higher than in others. This is not true. In the first place, enough agricultural products are raised in the neighborhood of all the mines in these counties to supply them at as low, if not lower, rates as they can be had at San Francisco. Generally speaking, in the neighborhood of the mines in Siskiyou, Sierra, Trinity and Plumas there is an abundance of water for generating power, timber, and, owing to the mountainous character of the country, a majority of the mines may be worked through tunnels and would not require the sinking of expensive shafts. Nothing but the abiding faith of the local people in these districts has kept up the record of these counties as gold producers, for they have had little help from the outside world. It is a notable fact, too, that in these counties may be found the best type of the old style miner—the "honest miner."

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J. F. HALLORAN.....General Manager

San Francisco, October 3, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—The Gates Canvas Plant at the Kennedy Mine; The Thurman Oil Burner, 273. Sectional Views of the Gates Canvas Plant, 277.

EDITORIAL.—Oil as Fuel in California; Pullman Cars and Investors, 273. California Mines and Speculation; Mines on Mexican Grants; Records of Mine Workings; Discovery of a Vein Necessary to Location, 274.

SCIENTIFIC PROGRESS.—The Atom; Specialization in Engineering; Engineering Education; Coal Fields of the World; The Number of United States Patents, 278.

ELECTRICAL PROGRESS.—Utilization of Waste Water; Growth of Electrical Industries in the United States; Power Economically Delivered; A Yacht to Be Operated by Electricity; An Odd Battery; Electric Smelting in Sweden, 278.

MECHANICAL PROGRESS.—The Chicago Tower; The Question of Fenders; Report of Commissioner of Patents; Trans-Mississippi and International Exposition; Gain in Production of Nearly Every Article, 279.

PRACTICAL INFORMATION.—The Naval Academy and Education of Engineers; Bacteria in a Cubic Meter of Air; Large Railroad Mileage in the United States; This Country Produces the Most Paper; Comparison of Teeth, 279.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories. 282-83.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 290.

MISCELLANEOUS.—Concentrates, 275. Gold Mining in California, 276. The Gates Canvas Plant; The Accumulation of Amalgam on Copper Plates; Yield of the Rand, 277. Coast Industrial Notes; Personal; Recently Declared Mining Dividends; Recent Patents; Notices of Recent Patents, 281.

Records of Mine Workings.

The opening up of mines all over California which have been more or less abandoned for a number of years past shows strikingly the necessity for keeping records of all mining operations. It is almost absolutely impossible in this State to obtain any records of the old abandoned mines. Now and then we come across an isolated case where partial information is obtained from miners or superintendents who have worked at these different places.

This was notably the case as to the workings of the old North Star mine in Grass Valley, when during the trial of their late lawsuit it was of the greatest importance to ascertain what developments had been made by the exploration work on the upper levels for the purpose of determining the continuity of the different ore bodies. The present owners and the different experts were unable to furnish any information on the subject, but the fortunate arrival of an old mining superintendent enabled them to gather information that was of the greatest value.

In many of the old abandoned mines of this State are large bodies of ore, which would pay well to work now, but which were passed by in the days when the mines were opened. It is a well known fact that in a great many instances in days gone by it was not possible, with the high price of wages and supplies and cruder methods, to work great bodies of comparatively low-grade quartz, which were opened by shafts and levels, and, therefore, many of the owners of these properties were compelled to drift through such deposits for high-grade rock, which would enable them to work the mines successfully. Had records been kept of all the old mines, many of these ore bodies would now be taken out and worked to a profit.

In cases of accidents in mines that have been worked many years it is often of great importance to know of the old workings in order to find the nearest places of approach to reach the different sections.

It would be of enormous value to the miners of this State if the records of all mines were kept. The State itself should require of every mine owner that surveys of all underground workings should be made and filed with the proper authorities. These would not only serve as records of workings, but would give information of inestimable value to those opening up new mines, in showing formations, in showing what the old operators had gone through, and enable those opening the new mines to know what to expect. As it is, they grope in the dark and know as little in many cases as if there had never been a mine opened in the district. It is well known that what occurs in one mine in any district is liable to occur in others.

Mines on Mexican Grants.

In a Virginia City paper there appeared last week an editorial in which it was stated that, with few exceptions, the land grants from Mexico conveyed no right to mineral beneath the surface and that, although the owner may not claim the mineral beneath the surface, it does not follow that the mineral area of such a grant is subject to location under the United States mining laws. "The surface does not belong to the United States. It belongs to the grantee or owner of the grant. He alone has a right to enter upon the ground, and any one else entering for the sake of locating a mineral land claim or any other purpose is a mere trespasser unless permission be given by the grant owner. Even the grant owner himself cannot locate the ground as a mineral claim, for the mining laws apply only to the United States. A mining claim cannot be located upon private property. From this it appears that there is no way by which, under the laws of the United States, title can be acquired to the mineral contained within the limits of the ordinary land grant. The owner of the grant cannot extract it, and he cannot give that right to any one else."

Upon this subject two California decisions bear. In the case of Williams vs. S. C. M. Assn. (66 Cal., 193), it appears that the defendant derived title from the Mexican or Spanish Government to several tracts of land since "commonly known as the Guadalupe mine," and the Supreme Court held that the right of the defendant to extract ore therefrom in no way depended upon a claim to the possession made in recognition of and in conformity to local rules adopted by miners of a mining district, or in accordance with the usages or customs of a locality. And the Court cited the case of the Fremont grant, saying, in that connection, that, "although it was not a mining claim, many mines have been opened within its boundaries, and the owners of the grant may claim such mines as their own." The question in this case before the Court, as in Morse vs. De Ardo (107 Cal., 622), was whether land held under a grant or an "agricultural patent" was subject to a lien for the wages of laborers employed in working a mine upon it; and in both cases the Court held that such land was not a "mining claim" within the meaning of the Mechanics' Lien Law.

As a general proposition as shown by these two cases—and it is a doctrine of common law—a man who holds title to the surface owns up to the sky and down to the center of the earth. One, therefore, owning certain territory would naturally have the right to devote it to any purpose that he sees fit—either raise crops thereon or dig minerals therefrom, if any should exist therein. If there exists any restriction in any grant, as mentioned in the editorial, the provisions of the particular grant would have to be looked into; but in no event can any person initiate a valid title to a mining claim upon ground held by another, no matter what that title may consist of.

Discovery of a Vein Necessary to Location.

In a case in a Colorado court lately a party asked the judge to instruct the jury that, to constitute a valid location of a lode mining claim, it was not necessary that a vein or lode of mineral rock in place should be discovered within the limits of the claim attempted to be located, but that a valid location might be made, if in other respects complying with the law, if the discovery of a vein is made by the locator upon an adjoining location owned by him and others, which vein, if maintaining the same strike as at the point of discovery, would pass into the claim attempted to be located, although, as a matter of fact, the vein is not traced, or shown to have passed, into the latter location.

In denying the motion the court said:

This contention is based upon a supposed analogy existing between annual assessment work, which may, in certain circumstances, be done outside the claim, and a valid discovery, which is a condition precedent to a valid location in the first instance. But this contention is contrary to all previous announcements upon this subject, and finds no support in the Federal or State statutes, and, in the absence of a decision by the Supreme Court of the United States to that effect, we decline to establish such a doctrine. The discovery must be within the limits of the claim located, and upon unappropriated territory.

The matter of what constitutes a valid location has engaged much of the attention of the courts. A few of the decisions upon the point of what constitutes a discovery sufficient to support a valid location have been handed to us by Mr. A. H. Ricketts of this city. They are as follows:

In United States vs. Iron S. M. Co. (128 U. S., 673), the Supreme Court of the United States said:

It is the policy of the Government to favor the development of gold and silver and other metals, and every facility is afforded for that purpose; but it exacts a faithful compliance with the conditions required. There must be a discovery of the mineral, and a sufficient exploration of the ground to show this fact beyond question. The form, also, in which the mineral appears, whether in placers or in veins, lodes or ledges, must be disclosed so far as ascertained.

Again, in King vs. Amy & S. M. Co., (152 U. S., 222), the same court said that a location can only rest upon an actual discovery of the vein or lode. In North Noonday M. Co. v. Orient M. Co., (Fed. Rep., 522), Judge Sawyer said:

It is only necessary to discover a genuine mineral vein or lode, whether small or large, rich or poor, at the point of discovery within the limits of the claim located, to entitle the miner to make a valid location including the vein or lode.

In Van Zandt vs. Argentine M. Co., 8 Fed. Rep., 725, it is said that to constitute a body of ore a vein or lode, it must exist in mass and position, not in a broken and fragmentary condition, intermingled with the slide and debris on the surface of the mountain.

Again, in Bank vs. Justice M. Co., 58 Fed. Rep., 106: When the locator finds rock in place, containing mineral, he has made a discovery, within the meaning of the statute, whether the rock or earth is rich or poor, whether it assays high or low.

In Iron S. M. Co. vs. Cheesman, 3 Fed. Rep., 297. A vein or lode is in place within the meaning of the statute if the ore body is continuous, and so far as the ore body is continuous it must have been deposited in that form, or removed bodily, and with its enclosing rocks to the place in which it may be found.

In Crossman vs. Pendery, 8 Fed. Rep., 693: Priority in discovery gives better title to mineral in place than priority of location and continuous possession.

California Mines and Speculation.

Since the beginning of the present so-called revival in mining there has been devoted less attention to California than to any other important mining field in the world by the journals published in Europe and in the East in the interest of mining investors. There are two principal reasons for this: One is the fact that stock-jobbing methods have almost entirely ceased in this State; and the other is that the nature of the mines gives less opportunity for making deals in shares in California mines on stock exchanges. They are nearly all gold mines, and unlike silver and other mines, are not subject to sudden fluctuations in value owing to the irregularities of the ore bodies.

Californians learned a valuable but expensive lesson from the Comstock stock gambling of the seventies and early eighties. To such an extent has this lesson been taken to heart that the general public will not buy shares in any mine. This does not show, by any means, a want of confidence in mining, for people of all classes are more interested in that industry than ever before, but always in a cautious, business-like way. Those who invest do so only upon personal knowledge of the mines themselves or upon the recommendation of people they know and can trust. It is all done just as they would invest in real estate or go into any commercial business enterprise.

To this want of a speculative spirit is due in large part the failure of papers like the *Financial News* of London to notice California. Its clients are stock buyers who learn of the mines through the public prints, and not through direct investigation, and who purchase rather for speculation than investment.

The mining people of California have not acquired again the habit of stock-jobbing, such as was in vogue during the palmy days of the Comstock, and so do not give much encouragement to outside speculators to do business of that nature in this field. While this has done much to prevent California from receiving the attention of the mining speculative world, in the end it will be a good thing for us, for our mines have not been boomed by any factitious methods.

Within the past few months signs have been shown that we are to be large gainers by this. While we have not attracted the attention of the syndicates and companies of the Old World who are looking for mines for speculative and stock-jobbing purposes, California is now engaging the attention of the largest conservative companies which purchase mines for the sake of investment. The Exploration Company, the largest concern of the kind in the world,

has made two or three investments, has had a number of properties examined, and within a few days a well-known mining engineer has arrived here to remain in this State in charge of their interests. The mere fact of his coming is evidence that the Exploration Company intends to extend rather than curtail its interests here.

Capitalists interested in the Chartered Company are having their attention directed to the Pacific coast by their consulting engineer in London. The consulting engineers of both these companies are Californians. Most of the experts employed by them are Californians, whether the work is here, in Africa or in any other part of the world.

When a few years ago California was called upon to send many of her best mining engineers to other fields, it was predicted then that we would become short of home talent for developing our own mines, and, in a measure, this would be a loss to us; but, really, on the other hand, it turns out to have been a good thing.

Many of these men have taken leading places in the mining world. They have been placed in positions where they can compare the relative merits of the leading gold fields of the world, and the fact that many of them are drifting back here goes to show their faith in our mines. More than that, they return with the confidence of their employers abroad and with an acquaintance and connection that will enable them to do much toward interesting capital in California.

Concentrates.

REPORTS are made of gold discoveries in Newfoundland.

A STRIKE of a good body of ore in the Cadmus mine at Nevada City has been reported.

THE late storms in the Sierra Nevadas have caused predictions of an early and severe winter.

THE Golden Drip, in British Columbia, has been bonded by J. D. Warner of New York for $50,000.

AT Lead, South Dakota, last week over 200 miners were laid off with malignant typhoid fever.

A NEW hoist is to be put up in the Rising Star gravel drift mine at Central Hill, Calaveras county.

AT the Tyro mine, in Mariposa county, it is proposed to increase the number of stamps from 10 to 20.

SHAW & Co., owners of the Golden Fissure mine in Butte county, are preparing to build a quartz mill.

THE Homestake Mining Company of the Black Hills has declared dividends to date amounting to $5,993,750.

IT is claimed that the output of bullion from Gilpin county, Colorado, will be larger this year than ever before.

A CHINESE hydraulic claim on Slough creek, in the Cariboo country, has been purchased by a Victoria company for $25,000.

THE Bunker Hill Gold Mining Company proposes to erect a 10-stamp mill on their property near Coulterville, Mariposa county.

SOME people are investigating the black sand of the beach below Crescent City with a view to working it with new appliances.

THE owners of the Selleck mine at Haywards, Mariposa county, are arranging for the purchase of new machinery in this city.

THE Citizens' Bank of Grass Valley last week bid in the Pittsburg mine, hoisting works and machinery for $3805.29 at sheriff's sale.

ANGUS MACKINTOSH, owner of the Hayseed and Triumph mines at Whitlocks, Mariposa county, is purchasing machinery preparatory to starting up.

THE principal value of the early rains in the Sierras has been in extinguishing fires and so saving much timber that is or will in time become valuable.

THE De Lamar Company has promised to erect a large, substantial schoolhouse in De Lamar, Nevada, providing the citizens select and prepare the site.

A STRIKE of rich ore in the big tunnel at Austin, Nevada, encourages the people of that town with the idea that there will be a return of prosperity soon.

BETWEEN the mines of southern Oregon and those about Baker City, in northeastern Oregon, that State gives promise of becoming a large producer of gold.

THE recent rains have cleared the air of smoke in British Columbia and the hills about Trail are again full of prospectors who were driven out by the forest fires.

AT the Horsefly mine, in the Cariboo country, the presence of cement has made it impossible to work much ground by hydraulicking, and arrangements are being made to drift.

A NUMBER of dredging machines have been built for working the auriferous gravels of the Quesnelle, in the Cariboo country, but, it is said, none have been worked successfully so far.

THE Great Falls Mining Company has completed the construction of a dredger for working the gravel of the bed of the Missouri river in Montana between Townsend and Canyon Ferry.

IT is again reported that the War Eagle, Iron Mask, Virginia and Poorman mines, in the Trail Creek country, in British Columbia, have been purchased by an English syndicate for $1,000,000.

THERE are about 200 people now on the upper part of the North Yuba, working the bed of the stream by turning the watercourse with brush and stone walls. A majority of them are Chinamen.

F. AUG. HEINZ of Butte, Montana, has returned from London, where he went to enlist English capital in railway, townsite and smelter properties in the Trail Creek district in British Columbia, but is understood to have been unsuccessful.

A DISCOVERY of nickel near Colville, Washington, has been reported. The ledge in which the metal exists is about four feet in width. Nickel is known to abound in many places north of that city, but this is the first discovery that promises to be valuable chiefly for that metal, says the *Spokesman-Review*.

THE copper veins in the Escalante mountains, in Colorado, are attracting attention. It is claimed that the Indians formerly resorted to this region for the purpose of getting copper for their implements, and, even with their crude methods of reduction, were successful in getting out the metal, which was hammered into shape.

WYOMING is giving promise of becoming a rich mineral-producing State. Reports have come of late of the opening up of many placers in different parts of the State of the discovery of asbestos mines, and last of the discovery of very rich quartz on the South Fork of the Grand Encampment, northeast of Rawlins. There are reported to be free gold and rich veins of milky white color.

A MINING MAN, who has returned from Sonora, Mexico, says that the mines of that State generally produce an aggregate of 650 tons a month, which output would, however, be multiplied many times if there were better facilities for transportation. But when ores are packed and hauled from 30 to 150 miles before reaching a railroad, they must be exceedingly rich to be moved under existing conditions.

THERE is considerable activity in placer mining all along the Columbia river, from Northport, as far down as Marcus, in Washington. At Six Mile bar a 40-horse power pumping plant is being put in by Spokane parties for the purpose of raising sufficient water from the Columbia river to mine a tract of ground. These bars were worked profitably in the early 60's, and in later years the Chinamen have found it profitable working them.

THE *Kootenaian* of Kaslo, B. C., says: "A special dispatch to the Toronto *Star* from Rossland states that a body of ore 30 feet in width had been struck that day in the Mayflower, upon which smelter returns put a value of $56 per ton. This is probably all right, but in this country it requires a little more than one day to get smelter returns. The same dispatch says the ore is chalcopyrite, and that the galena and quartz are gangue. Great country!"

OWING to the growing interest in British Columbia mines the Toronto Stock Exchange has decided to receive applications for the listing of mining stocks. The conditions require that in each case evidence must be furnished as to the proper incorporation of the company, good title to mine or principal mines owned, that at least $25,000 has been expended in operating, that the stock issued as fully paid up is non-assessable and free from subscription liability.

THERE is considerable suffering from want of necessities and cold weather among the boomers who are camped on the borders of the Blackfoot reservation in Montana waiting for its opening to settlement. The number has dwindled down to about 100, and it will be nearly six months before the opening will take place. But there are reported rich mineral deposits within the forbidden land, and doubtless the hope that springs eternal in a miner's breast will keep some of them there all winter.

THE Denver *Republican* says that T. W. Goad, who has been manager of the Gold and Silver Extraction Company of America in Colorado, has resigned and gone to London, where, in connection with a number of capitalists, he has established a bureau for the promotion of mining enterprises in this country. After getting the London office in operation and putting the business in proper shape, Mr. Goad will return to the United States and establish an office in Denver and another in San Francisco.

A NEBRASKA man was in Denver, Colorado, last week to look into the cyanide process for the purpose of working an auriferous deposit, which he describes as follows: "The material carrying the gold is clearly a sedimentary deposit lying in a stratum for 2 to 7 feet thick. We find it sometimes 20 feet thick. Generally it is found a few feet below the surface, but it frequently rises to the surface. The locality is on the Elkhorn, 50 miles north of Lincoln and about 50 miles east of the eastern line of Colorado. It has been traced for a distance of 100 miles, and one of the objects of our company is to discover the extent of the deposit."

THE United States Geological Survey has issued a pamphlet on the stone industry of the United States in 1895, by William C. Day. The total value of different kinds of stone produced was $34,688,816, against $37,055,030 in 1894. California stands fourteenth in the list of States as to the amount produced, with $715,450. In 1890 California produced granite to the value of $1,329,018, while the value of the 1895 product was only $348,806. The value of the marble product in this State in 1890 was $87,030, in 1892 $115,000 and in 1895 $22,000. Of the sandstone product the value in 1890 was $170,000 and in 1895 $11,933. However, similar decrease is noted in other States and is all credited to the late financial depressions.

THE Redding, Shasta county, *Searchlight* says: "Experimenting is at an end with the Mountain Mines, Limited. The new water-jacket smelter recently erected has been running for several weeks, giving satisfaction. Two hundred tons of ore are being handled each day. This means a yield of from $4000 to $8000 per day. Two shifts of twelve hours each are being run. The old smelter is expected to start up this week. Two more water-jacket smelters will be erected shortly. About 250 men are employed at Keswick, besides over 100 men at the mine. Until now the company has been operating with little or no returns, and it means much to the miners and this county in general that the Mountain Mines, Limited, are at last on a paying and permanent basis."

IN a late number we spoke of the delays in the issuance of the U. S. Geological Survey reports upon mining districts. Now comes the Salt Lake *Herald* and says that it is probable that a resurvey of the Mercur district will be ordered, and continues: "Certainly the report which followed Mr. Spurr's examination—owing to the interval between the date of its issue and the collection of his data—is very unsatisfactory. It was a "back number," in plain words, before it began to circulate. Before its appearance so many changes had developed in the quality of the ores as to render it of little benefit except as a treatise upon their occurrence. According to those interested it dealt too extensively with the past and not enough with the present."

THE Spokane *Chronicle* says: "It is stated that Supt. Hall of the Le Roi has begun his administration by raising the wages of the miners. Rossland has always been what is known as a 'cheap camp,' the scale of wages paid there being lower than in most mining camps, and especially new ones. Mr. Hall has therefore taken the first steps toward raising it to the level of other gold camps. Miners are now paid $3.50 for eight-hour shifts and carmen and shovelers $3. This is an increase of 50 cents a shift all around."

THE British Columbia *Mining Journal* says: "The Wonderful, a mile and a half from Sandon, is the most peculiar silver property in the West. It is worked like a large placer claim. The owners have turned little streams down the side of the mountain and from the surface wash in a gorge 400 feet long, 80 feet wide and 40 feet deep, it is said, there has been gathered $60,000 high-grade, clean shipping ore. Thirty men are working on this claim, and they are taking out more ore than if they were working on a vein. The ore is gathered off the wash, stacked in piles and afterwards carried in sacks to the ore house. It is almost like picking up nuggets from a gold placer claim. The Ruth, also above Sandon, is a fine property and is working a large force of men."

THE Canadian Government is evincing a greater interest in assisting the development of the mines of the West than was ever done in this country by the Federal Government. The Alberta *Tribune* says: "The development of the West means expansion of Eastern manufacturing industries to supply the increased market; the employment of a much larger number of artisans; the increase in value of Eastern real estate in the vicinity of the manufacturing centers; and the general increase of prosperity of the nation. If the disabilities under which the West labors, and which the Government can to a great extent control, were removed, and an intelligent, well-thought-out policy of development pursued, we would see every Province of the Dominion benefiting thereby."

ACCORDING to the Denver *Republican*, the lessee is again in evidence in Cripple Creek. "There was a prejudice against him when the year opened by the companies who received back exhausted mines from him, and there was some talk about the day of the lessee being ended. Just then it looked as if every inch of idle ground in the district was to be bought up by outsiders and that there would be millions of money available for development; but that soon passed. The country showed it had no millions to spare, and the companies with money to operate were few. It began to be seen that the idle ground was to remain idle unless the lessee was invited to go prospecting. Next year those mines he is working now will go back to the owners and he will be forced out to hunt more ground and make it valuable for other companies; but the lessee finds the system a paying one for himself, and, collectively, he is the best friend Cripple Creek ever had."

AN English syndicate has taken up an "ore atomic reduction process," which is described by them as follows: Everyone concerned in mines is aware that one of the greatest difficulties miners have to deal with is the crushing of quartz, especially those of refractory ores, which, owing to the presence of iron pyrites, render the metal of excessive hardness. To deal with this, enormous expense has to be incurred. This marvellous invention will do away with all the crushing and stamping and pulverizing, and within an hour enable a miner to reduce the hardest quartz to the condition of sand, and even of fine flour, without slime, and perfectly free from the various deleterious substances which are the enemies of the gold miner all the world over. Wherever tried, no matter how hard the quartz, it yielded to the process in times varying from twenty minutes to one hour. The extraordinary thing is that experience has shown that if, under the invention, the ore fails to break into particles within an hour, therein lies proof positive that it contains no metal.

THE Exploration Company of London, which has the backing of the Rothschilds and at the head of which is Hamilton Smith, a Californian, is arranging for the purchase of all the stock of the Anaconda properties in Montana and the Homestake mines in the Black Hills. More than a year ago the Exploration Company purchased one-quarter of the stock of the Anaconda Copper Mining Company from the Hearst estate for $7 500,000. Following this sale the same purchasers obtained an option upon a second quarter of the stock—250,000 shares—at $9,000,000. This option was closed and the transfer made a few months ago. Immediately after this sale and transfer was completed, the company sent its expert to this country, and, after he had examined the property, he obtained from J. B. Haggin and Marcus Daly a third option on 500,000 shares of stock at the same price that was paid for the second parcel of 250,000 shares, or $18,000,000. Advices from London say the expert has started for New York empowered to complete the purchase and transfer of this stock, which will make the Exploration Company, or the Rothschilds, sole owners of the Anaconda Copper Mining Company at a cost of $34,500,000.

T. A. RICKARD, State Geologist of Colorado, says: "It is a noteworthy instance of the vicissitudes of mining that of the several properties which in 1889 yielded more than three-quarters of the output, not one is to-day producing, although in several instances a large yield is now coming from mines adjacent to them and previously idle. Seven years is longer than the productive period of an average mine. One can extend the field of inquiry over the whole State, only to confirm the deduction just suggested. Of the properties which yielded over $500,000 in 1889, more than half are to-day producing less than $50,000; others have taken their places. Nor is this characteristic of Colorado only; on the contrary, it is particularly worthy of note in discussing the history of a State whose ore deposits are notably more persistent than those of most mining regions. It is due to the hurry to realize upon the wealth uncovered by the pick of the miner; it is aided by the rapidity of exploitation rendered possible by a magnificently elaborate industrial machinery; it is also traceable largely to the impudence of mine managers, who are forgetful of the necessity of doing an amount of exploratory work which shall keep pace with the removal of ore."

Gold Mining in California.

NUMBER II.

By AUG. J. BOWIE, Mining Engineer.

Our Miners.—It is proper before passing from our mines to other subjects, that a fitting tribute should be paid to our miners of California and Nevada. The average intelligence of our foremen and workmen stands unequalled. They have been the pioneers of the country and the advance guard of civilization. They have braved the dangers of the development of a new country, and where necessity demanded they have not hesitated to lay down their lives in pursuit of their vocation. They have opened up mines to a depth of about 2000 feet to 3200 feet, under circumstances unparalleled in the annals of mining and on a scale unprecedented in history, showing a degree of skill and ability in the handling of the output which has commanded the admiration of the world.

California Gold Quartz Mill.—The ore being extracted from the mine and delivered on the dump, is from there taken to the mills. Every miner is thoroughly familiar with the California gold quartz mill, and when it is contrasted with the antiquated European stamp works, its superiority in every respect is at once patent. Time will not permit us to enter into the details of the construction of a quartz mill, as it would occupy too much space and would partake largely of mechanical details uninteresting to any one but a mechanical engineer. A few general remarks may, however, be of value.

The mills are provided with rock breakers in accordance with the requirements, and are so arranged that when the ore is discharged from the cars the finer portions pass through the grizzlies to the ore bins, which automatically discharge into self-feeders behind the batteries, while the coarser particles fall by gravity to the rock breakers, through which they in turn pass to the ore bins. The weight of the stamps, including tappet, boss and shoe which we are now using in the large mills, will average about 860 pounds each, and running with double cams they are speeded to drop 85 times per minute. The length of the drop is from 9½ to 7 inches, as the case may be. The cams are not simply cams cut in half circles terminating in a tangent like that occasionally seen in the mountain regions of the West, but are laid out on the involute of a circle, the radius being the distance from the center of the cam shaft to the center of the stem, allowance being made for the nub of the cam and clearance of the tappet.

The stamps drop on dies set in the bottom of iron mortars fitted with side and end linings. The mortars are set on blocks and bolted to them, the tops being covered with blankets. They are arranged in batteries of five and fall from the center outwards one after the other (3–5–2–4–1), this insuring complete circulation of the pulp. Mortars properly constructed for gold milling should be fitted with soft copper amalgamated plates in the back inside and on the front inside, and have a low discharge over the top of the dies. In front of each battery there should be a table of equal width, with amalgamated soft copper or silver plates set in lengths of 8 or 10 feet, to receive the pulp discharged through the screen which fits the front of the mortar. The screens used are either punched or cut slot, or wire screens, the number or mesh depending on the fineness to which the ore or material is to be crushed. The other accessories, such as riffles, vanners or blankets, it is unnecessary to describe here.

Power.—The stamps are driven by steam, water or electric power. Direct battery amalgamation in gold milling is what is known as wet crushing, water being continually discharged through the battery to assist in removing the pulp as it is crushed. The quantity of water requisite for each battery of five stamps with a No. 6 punched screen, when from 2½ to 3¼ tons per stamp are worked during twenty-four hours, will vary from 1¼ to 1½ inches, the inch of water being figured at 1½ cubic feet discharged per minute. The power required to drive a five-stamp battery may be placed at 1½ H. P. per stamp, rock-breaker capacity and vanners requiring an additional amount pro rata with the size of the rock breaker and number of vanners employed. As a general proposition, it will require two Frue vanners to handle the pulp from each battery of five stamps, and one 9 in. x 15 in. Blake rock crusher would suffice under ordinary circumstances for forty stamps. No study of the theory of gold mill amalgamation will avail in its practice. It is by actual experience alone that a thorough knowledge of it can be acquired.

Starting Up.—Where mills are to be started up it is, of course, supposed that the quartz has been tested and that some idea has been formed of its contents in free gold. In many cases this may not have been done, though the old miner would never venture to build a mill unless he had thoroughly assured himself by his own hand tests of the value of the ore. Any miner who will take a fair average sample of the quartz, crush it thoroughly, and amalgamate a small amount of given quantity, can approximately determine the amount of free gold which he may expect to get by battery amalgamation. Experience in amalgamating gold in a battery teaches the amalgamator that the quantity of quicksilver required must be proportioned to the amount of gold contained in the quartz. In other words, there is a proportion existing between the gold and quicksilver forming amalgam, and the finer the particles of gold the greater the amount of mercury necessary. The amalgamated gold is deposited on the back and front plates in the mortar, the detached pieces packing between the dies, or discharged through the screens over the lip of the mortar and caught by the amalgamated copper plates on the table in front of it. No matter how accurate the knowledge may be of the metallic contents of the quartz, the time when the quicksilver is to be fed into the battery and the quantity to be used are regulated only by the actual showing of the amalgam on the table plates.

In starting up the battery, the plates being clean and freshened with a little quicksilver, the stamps are allowed to run a half hour or more on the quartz to securely pack the dies and the inside of the mortar without the addition of mercury. When the dies and mortar are packed quicksilver in very limited quantities is fed in at the back of the mortar. The amalgamator now carefully watches the condition of the table plates. These plates, kept in proper condition at all times, indicate the state of the amalgamation and the requirements in ordinary milling on average rock.

Quicksilver.—A small amount of quicksilver is added every half hour as long as the amalgam formed on the table remains sufficiently plastic. Should the quicksilver be observed to form in drops or globules and not to be depositing regularly in the first 2 or 3 feet in the form of amalgam of the consistency of putty, it indicates that further addition is unnecessary. On the other hand, the tables show that if the amalgam on them has become too hard, and does not yield readily to the touch, it is proof positive that the metal is absorbing the quicksilver and more is necessary. The plate should, at all times, hold amalgam of a proper consistency of hardness, and the surface of the amalgam should be repeatedly "broomed up" and kept fresh and bright.

It is extremely difficult to describe all the features which present themselves in gold mill amalgamation. The tables should be cleaned up once or twice during twenty-four hours, the excess of amalgam taken off and the plates kept bright and coated with quicksilver. The amalgam (escaping from the battery) is principally confined to the upper part of the table, any excess being scraped off with pieces of hard rubber and put to one side. An excessive use of quicksilver will run the greater part of the amalgam into the sluices.

When the mill shuts down at the end of a run, and the plates are thoroughly cleaned, the table plates should be well scoured with sand or with a brick, leaving them soft and in a broomy condition, which is best adapted for receiving the quicksilver and catching the amalgam. Under no circumstances should acids or cyanide of potash be used, as they only burn and harden the copper.

Approximating the Yield.—It is apparent from what has been said that a competent amalgamator can approximate from day to day what his quartz is running, so that a very close estimate of a month's yield may be made from the record which is always kept of the exact amount of quicksilver used daily in each battery. There are, of course, exceptions to this rule which may deceive the amalgamator. Sulphurets in large quantities will absorb an excess of quicksilver, and even after floating the amalgam give an excess of weight which cannot be ascertained until after the amalgam has been retorted.

The First Run.—The first run of a mill is very apt to be disappointing, a result generally due to an exaggerated estimate of the value of the quartz, or the quantity of base metals, babbit, lead, etc., which invariably find their way into the batteries of new mills, the bars produced being large, but of low fineness. A case due to other causes was mentioned a short time ago in the reports from Johannesburg of the workings of the deep levels on the Rand. The report stated that some 20,000 or 30,000 tons worked from the 2000-foot level of their principal mine yielded only 3 or 4 dwts. per ton. The stockholders, discouraged by the returns, looked to their manager for an explanation of this poor yield, and the answer reported given was: "That in a new mill the plates and quicksilver had to be charged, and that the plates had absorbed some $75,000 of the gold." The Johannesburg *Critic* quaintly remarked that "the manager had better smelt the plates." Carelessness or ignorance on the part of the amalgamator is a very serious proposition. His position is a confidential and most responsible one.

Mill Tests.—It is not unfrequently the case that parties purchasing mines are recommended to have a mill test of the ore made at the mine. There can be no objection to such tests, if fairly made; but, under the conditions in mining regions where these trials are conducted, nothing can be more dangerous or offer greater facilities for fraud. Any person sent to examine a mine should be qualified to give a reliable opinion on the value of such property, without being dependent on the results of such mill tests.

We have now described at length the milling of gold quartz. It only remains to be added that in all large works of 80 or 120 stamps the mills are cleaned up but once a month. They shut down in the morning at 6 o'clock, and by 6 o'clock in the evening the entire mill has been overhauled, put in perfect condition and started anew for the succeeding month's work.

Treatment of Amalgam.—The treatment of the amalgam which has been collected from the battery plates inside the mortar, and from the tables, is exceedingly simple. The clean amalgam is floated in quicksilver, all foreign substances detached, strained and pressed into balls as large as can be conveniently squeezed by hand. The other portions, containing considerable sand or foreign substances, are put into a small gold clean-up pan, to which quicksilver is added. The amalgam, with quicksilver, is subsequently tapped off, strained, cleaned and retorted, together with the other amalgam.

The retorted amalgam is melted, run into bars, chipped, assayed and stamped. The bars are then ready for delivery.

The result of experience in milling low-grade quartz has demonstrated that economy requires the largest possible quantity to be treated at the smallest cost in the shortest possible time, with due reference to the percentage of yield.

To accomplish this end, in the first place, the mill should be so constructed as to avoid all possible handling of the quartz from the time when it enters the mill to its discharge.

Secondly, large rock-breaker capacity is essential.

Thirdly, the square-bottomed die is the most desirable.

Fourthly, there is no economy in using shoes or dies after their surfaces have been irregularly worn to any great extent.

Fifthly, false bottoms for dies are not economical.

There is a peculiarity about men operating mines and mills which should here be noted. Some superintendents figure that great ability is shown by the largest production of quartz at the smallest cost, hence the distribution of accounts frequently shows very small cost for the tonnage produced, while the cost for exploratory work and construction is made to appear very large; others endeavor to show that the costs of milling are insignificant and that an exceedingly low-grade quartz can be economically worked. This is not difficult to show on paper, because it is easily accomplished by diminishing the value of the ore per ton and increasing the tonnage worked.

From experience in the Black Hills, Dakota, where some of the largest mills in the world have been built, and in California, it is estimated that from 2½ to possibly 4 tons per stamp can be crushed in twenty-four hours. This depends, of course, on the character of the material and the size of screens through which the pulp is passed, the stamps weighing from 800 to 900 pounds and falling from 85 to 90 drops per minute.

The cost of milling varies from 40 cents to $1.15, and the difference between milling by steam and milling by water is 80 cents (steam) to 45 cents (water), the basis of this estimate being on labor at $3.50 per diem and wood at $4.25 to $4.50 per cord.

The stamp mills to-day running in South Africa and other parts of the world have all been copied from the designs and work of the California mechanic, to whom the world is indebted for the great improvements in milling machinery. One frequently reads of the marked advance which has been made in the milling of gold quartz during the last fifteen or sixteen years, but I fail to find any improvement made on what was already in practice in California and Dakota sixteen or seventeen years ago. With the exception of vanners, which have been largely perfected during this period, permitting the economical concentration, there has been nothing new of special note. Plattner's chlorination process has been known and used for forty years and has been most economically and successfully handled in this State.

Silver-plated battery and table plates are more generally used now than formerly. They were in use twenty-five years ago, but too expensive for general service.

The costs of mining and milling in foreign lands are held up as models of economical handling of works. As a matter of fact, none of them stand the light of investigation and could bear fair comparison with the work done in California or Dakota. On the contrary, take the price of labor and supplies paid in this country and abroad, the character of the material mined, and it will show that California is still foremost in the handling and working of gold ores.

The cost of mining and milling per ton, as we understand it in California, after the plant and mine has been paid for, is determined by dividing the total tonnage mined and milled into the total costs, and the yield per ton is the tonnage milled divided into the gross bullion product—the profit per ton being the difference between the cost and yield per ton.

The salary and office accounts are chargeable alike to mine and mill accounts, as are likewise all legal expenses. All disbursements of whatever nature made for account of the mill or mine after the property has once been paid for are chargeable pro rata per ton to their representative accounts of mining and milling. The value of a mining plant after the mine has been worked out is practically *nil*.

(*To be Continued.*)

The Gates Canvas Plant.

Written for the MINING AND SCIENTIFIC PRESS by W. S. HUTCHINSON.

At some of the California gold quartz mills it has been found that a considerable amount of value escapes with the tailings in the form of finely divided rich sulphurets, which are too fine to settle on the belts of the concentrators. The tailings of the Kennedy mill, near Jackson, Amador county, California, contain about $1 per ton in gold, and a portion of this value is in the form just mentioned. For several years Mr. G. G. Gates has treated these tailings and recovered the fine sulphurets with remarkable success upon his canvas plant. His methods are adapted to the treatment of any mill tails when their value is contained in the form of fine, rich, heavy mineral which escapes other methods of concentration. This plant has been entirely rebuilt, with many improvements, since its description by Mr. W. H. Storms, a little more than a year ago, in Bulletin 6 of the California State Mining Bureau.

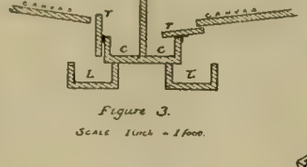


Figure 3.
SCALE 1 inch = 1 foot.

The Kennedy mill has eight batteries of five stamps each and twenty-four 4-foot concentrators. Mr. Gates assumes, to start with, that the coarser portion of the pulp from the mill contains its value enclosed in grains of quartz in such a way that it cannot be recovered on his plant without further crushing. Therefore, first of all, he separates the coarse sand and throws it away, while he saves the fine pulp which contains the fine sulphurets which have escaped the concentrators in the mill, and which he aims to catch on his plant.

The separation of the coarse from the fine is effected in what Mr. Gates calls a "segregator." There are two of these, each constructed as shown in the sketch (Fig. 1). The pulp from the mill enters the distributing boxes, which have a bottom of sheet iron with $\frac{1}{8}$-inch holes. These deliver the pulp in a shower to the separating box of the segregator. In this box the coarse sand settles, while the fine material is kept up by a rising stream of clear water, which is delivered at the very bottom of the pipe and just above the spigot. Sand and water escape steadily from this spigot, which is a $\frac{3}{8}$-inch bushing of iron pipe in a rubber cork. The fine pulp overflows in a sheet over the end of the machine and enters a divided trough with twelve compartments, through which the pulp is distributed to the canvas tables.

The plant has twenty-four working tables arranged in two rows of twelve, facing each other, and sloping together to the tails launders. In addition to these, two extra tables receive the pulp when it is turned off from a pair of the working tables for the purpose of hosing off. The canvas of each table is 12 feet wide and 10 feet long, and is stretched upon a floor with a slope of $1\frac{1}{2}$ inches per foot. The arrangement of distributing troughs and tables is shown in the sketch plan and cross-section (Fig. 2). The device for receiving the tailings and concentrates at the foot of the tables is shown in Fig. 3. While pulp is running over the table the tilting tail (T) is turned so as to deliver into the tails launder (L). After washing, the tail is turned as shown the right, and the concentrates are hosed into the launder (C), which is divided by a splashboard (S).

When the pulp has run on a pair of tables for an hour it is turned of and run to the extras. Clear water is turned on for a few minutes in order to partially clean the sulphurets caught on the canvas. The tilting tail is then turned so as to deliver into the heads launder, and the table swept off with a hose which throws a broom-shaped stream. These concentrates run to a settling box 2 feet by 12 feet by 2 feet deep. The overflow from this box goes to a canvas table and then to the tables which receive also the tails from the vanner mentioned below. The material settled in the tank has a value of about $30 per ton in gold and must be cleaned. It is, therefore, shoveled to a trough, whence it is washed by a small stream of water to a vanner. This is a short, smooth belt and end-shake machine of Mr. Gates' own design. It is run with a very rapid shake, steep slope and thick pulp.

Travel—1 foot in 11 seconds.
Throw—$\frac{7}{16}$ inch.
Shake—240 to 260 per minute.
Slope—$1\frac{1}{16}$ inches per foot.

The tails from the vanner go the table already mentioned, and that in turn discharges to two others in succession. The material caught upon these tables amounts to from two to three tons per month and has an assay value of about $60 per ton. The heads tank of the vanner overflows to three small settling tanks in a series, and the product assays more than $100 per ton.

The flow of the pulp over the tables takes the form of a succession of waves. At the head of the table these waves have a length of five inches from crest to crest and at the foot of the table twelve inches. This does not indicate a corresponding acceleration in the velocity of flow at the foot of the table, but is caused by the retarding of one wave by the sand in front of it until the succeeding wave overtakes it, when they go on together. These waves travel from the top to the bottom of the table (a distance of ten feet) in from 6½ to 8 seconds, as measured with a stop watch, and the depth of the pulp, measured with a micrometer gauge, was:

	1 Foot from Head.	*1 Foot from Tail.*
Crest of waves	.063 to .068 inch.	.068 to .075 inch.
Trough of waves	.050 inch.	.040 to .045 inch.

The Kennedy mill crushes about 100 tons of quartz per day through a No. 30-mesh wire screen, and

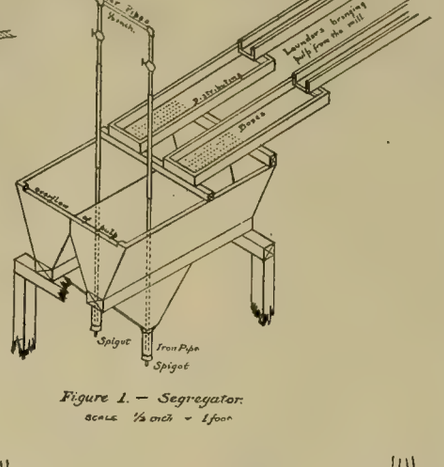
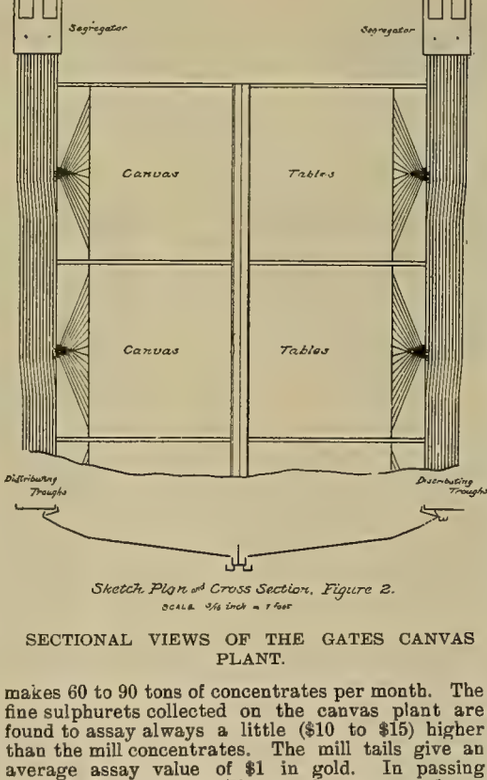


Figure 1. — Segregator.
SCALE ½ inch = 1 foot



Sketch Plan and Cross Section, Figure 2.
SCALE 3/16 inch = 1 foot

SECTIONAL VIEWS OF THE GATES CANVAS PLANT.

makes 60 to 90 tons of concentrates per month. The fine sulphurets collected on the canvas plant are found to assay always a little ($10 to $15) higher than the mill concentrates. The mill tails give an average assay value of $1 in gold. In passing through the segregator 70 tons of coarse sand are thrown away and 20 tons of fine slimes are delivered to the tables. No assays of these materials have been made for some time, but Mr. Gates estimates that the fine carries twice or three times as much value per ton as the coarse. The product of the plant is 12 to 16 tons of concentrates per month, with an average assay value of $100 per ton. The product is thus seen to be equivalent in value to about one-third the gross loss from the mill and 70% to 80% of the portion of the pulp actually passing over the tables. The concentrates are shipped to Selby's smelting works.

The amount of water used is estimated by Mr. Gates as follows:

	Miners' Inches.
Received with the pulp from the mill	12
Clear water used in the segregator	3
Clear water used in cleaning and hosing off	1
Total	16

This is verified by measurements made by timing floats with a stop watch in the tails launder. Mr. Gates thinks that the work could not be done with less water. About one inch escapes from the four spigots of the segregators, which could be easily recovered by settling.

Two men, one on each shift, to look after the vanner and hose the tables off once an hour is all the labor necessary. The plant is lighted by one incandescent electric lamp which slides on the conducting wires opposite the tables which are being hosed off. A little power is necessary for the vanner, which is secured at this plant from the tailings on a small overshot wheel.

No. 6 canvas is used which wears eight months, when it must be renewed. During that time it is shifted every four or six weeks, to bring the cracks of the floor in different places. Hot weather affects the canvas badly.

The cost of the plant, including everything, was $2000, with lumber costing $24 to $25 per M. and carpenters $3 per day.

Mr. Gates has secured several patents which cover his methods of separating the sand and slimes and the distribution of the pulp.

The Accumulation of Amalgam on Copper Plates.*

Continued Discussion of the Paper of MR. R. T. BAYLISS, Presented at the Pittsburg Meeting.

Frank Owen, Marble Bar, Western Australia: In connection with the discrepancy observed by Mr. Bayliss in the relative fineness of the bullion obtained by amalgamation on copper plates from the ore containing gold and silver, and the bullion obtained afterwards by scraping the same plates, a somewhat similar experience with a different class of ore may be of interest.

The observation to which I refer was made at the El Silencio mine, situated at Remedios, department of Antioquia, Republic of Colombia. The ore consisted of auriferous (mixed with a little arsenical and occasionally antimonial) pyrites, galena and zinc blende. The proportion of pyrites in the ore ranged from 1 to 12 per cent. The average assay value of the ore was one ounce gold and five ounces silver per long ton. It was mined at a depth of from 220 to 285 feet. The gangue was quartz and the country rock syenitic granite, often much decomposed, so that it was easily crushed. The proportion of silver to gold was found to be considerably higher in the galena than in the pyrites.

The ore was treated in a wooden 16-stamp mill, common in Colombia and Brazil. The shoes were of cast iron, weighing 140 pounds, and the total falling weight was 200 pounds. The mill was run at forty drops of five inches per minute. The screens were of 20-mesh diagonally punched Russia iron. Silver-plated copper plates, 4 feet long by 2 feet 6 inches wide, and set at an inclination of one in twenty, were used outside the battery only and were cleaned up once in twenty-four hours. The usual grade of bullion produced was: Gold, 600; silver, 350; total, 950. The amalgam contained from 55 to 60 per cent of sponge gold, which lost from 1.5 to 2 per cent in melting.

In February, 1891, four old plates, which had been in use from two to two and a half years, were scraped and produced bullion of the value of $22,500. The amalgam obtained by scraping contained from 45 to 50 per cent of sponge gold, which lost from 3 to 4 per cent in melting. The grade of the resultant bullion averaged: Gold, 450; silver, 300; total, 750; whereas, judging from the proportions usually obtained from the plates, one would have expected it to show: Gold, 473; silver, 277. After chipping off all the amalgam as far as practicable, the plates were melted down into thirty auriferous copper bars, which realized $750.

* Trans. Am. Inst. M. E., Colo. Meeting, Sept., '96.

Yield of the Rand.

The total output of gold in the Rand has been 10,072,116 ounces since the gold fields were declared open in 1887 to the end of July, a little over nine years. During the first half of that period the total output aggregated only 1,824,889 ounces, while during the last four years and seven months, ending July 31, 1896, the yield was 8,247,227 ounces. The yield of the first seven months of this year is somewhat short of the average of 1895, but it is increasing each month, and the total will probably considerably exceed the amount produced in 1895—2,227,640 ounces.

With improved processes lower grades of ore are being worked, as will be seen by the following table, which gives the grade shown by milling for the months of July from 1891, inclusive, about which time the cyanide process was beginning to make its influence felt:

	MILL. *Dwts. Per Ton.*	CYANIDE. *Dwts. Per Ton.*
1891	10.63	....
1892	9.49	....
1893	9.89	4.84
1894	8.95	4.25
1895	8.54	4.66
1896	7.50	4.86

Scientific Progress.

The Atom.

Sir Robert Ball, the eminent astronomer, in giving an explanation of the nature of the atom and the devisibility of matter, said lately: "Let us take for our illustration some substance which, as far as we can tell, is absolutely homogeneous, inasmuch as it consists only of a single element. I select for this purpose a piece of iron, and suppose it to be divided into two portions. Let each portion be subdivided again, and yet again, until at last it shall have been reduced to the minutest portion of which our senses can take cognizance. Each one of the little pieces, so obtained, will still possess all the qualities of iron. We shall further imagine that we are provided with some means for carrying on the subdivision of an iron particle to a point much beyond that which any mechanical appliance at our disposal can affect. We shall even suppose that we are able to continue the subdivision of the iron long after the particles have become too minute to be visible, even in the most powerful microscope. Modern science has, however, taught us that though this subdivision can be carried on so far, yet it can not be protracted indefinitely. A point would at last be reached where each of the little particles, though still possessing all the qualities of iron, would refuse to admit of any further subdivision. The particle in question may, no doubt, be composed of parts, but if we could separate those parts they would not be iron, they would not, in fact, be anything like iron. This piece of iron, which can not be further reduced, is called an atom. The derivation of this word indicates that the object to which it is applied is a something which can not be cut. We are thus led to the conception that all matter on the earth or throughout the universe is constituted of aggregations of atoms. The sun itself is no more than an enormously great, though quite definite, number of those ultimate atoms out of which all material objects must be composed.

"We may also illustrate the fineness, so to speak, of the ultimate texture of matter in the following way: Think of a plate of copper possessing the same thickness as the page on which this is printed. It is perfectly certain that if we had machinery by which we could beat out that copper until the plate was reduced to the thousandth part of its present thickness the thin sheet so produced would still be found to present all the characteristics of copper. Even if the sheet could be beaten out ten times more, so that its thickness were ultimately reduced to one ten-thousandth part of that of the original sheet of paper, the substance in the plate would still possess the characteristics, chemical and physical, of actual copper. It can, however, be inferred by an ingenious line of reasoning, given by Lord Kelvin, that if the plate thus attenuated were to undergo a yet further reduction, which would make it to have no more than the millionth part of the thickness of this sheet of paper, then the substance would have ceased to be copper in the sense in which we understand the word. It would approximate to a layer of individual molecules, further subdivision of which would be impossible."

Specialization in Engineering.

Specialization in professional pursuits, in engineering particularly, has become the natural and proper result of the growth of applied science. The civil engineer of past generations, who was supposed to command a comprehensive knowledge of every branch of engineering then practiced, from the design of a steam engine or machine tool to that of a bridge or city drainage system or complete waterworks plant, has virtually ceased to exist, and in his stead we find the steam engineer, the sanitary engineer, the bridge engineer and the engineer of various other subdivisions of the great field of engineering—each an expert in his particular line. It has been found impossible for one man to combine within himself the detail knowledge necessary to practice all these branches with entire success. One branch alone is almost sufficient to make a life study, and the engineering specialist of to-day finds himself busily enough occupied in keeping abreast of the times.—Cassier's Magazine.

LOOKING now over the field of tendency of engineering education, it is seen that there has been ever present a powerful impulse towards specialization, to which, indeed, nearly all others have been subordinated. This has demanded a higher standard of admission, great thoroughness in all fundamental subjects and a rigid adherence to scientific methods. Engineering education has had an active and healthy growth. It now enjoys the respect and confidence of the public, and its future is sure to be more influential than its past. It is not specialization that has caused its success, but rather the methods which specialization has demanded. Those methods have resulted in imparting to students zeal and fidelity, a love of hard work, of veneration for the truths of science and a consciousness of being able to attack and overcome difficulties. These elements of character are, indeed, the foundation of success in life. Looking now forward into the future, it is seen that in our efforts for the promotion of engineering education a wide field for work still lies open. The student should enter the engineering college with a broader training and a more mature judgment. The present methods of instruction are to be rendered more thorough and more scientific. In particular, the fundamental subjects of mathematics, physics and mechanics are to be given a wider scope, while the languages and the humanities are to be so taught as to furnish that broad, general culture needed by every educated man. In general, let it be kept in mind that education is more important than engineering, for the number of men who can follow the active practice of the profession will always be limited. Hence, let it be the object of engineering education to influence the world in those elements of character that the true engineer possesses, so that every graduate may enter upon the duties of life with a spirit of zeal and integrity, with a firm reliance upon scientific laws and methods, and with a courage to do his work so as best to conduce to the highest welfare of his race and his country.—Mansfield Merriman before the Society for the Promotion of Engineering Education, at Buffalo.

LONG before the coal fields of the world are exhausted, there is little doubt the workers on the borderland of engineering will have discovered some plan of tapping the great stores of energy around us, says *Cassier's Magazine*. The very earth we live on is whirling around like a huge flywheel; and if we could only find some way of utilizing its momentum, we could draw upon it for ages for all the power we want. It is, indeed, naturally drawn upon now in various things intimately associated with the work of the harbor and dock engineer. The flow of the tide in enormous volume up and down a river is accompanied by a vast expenditure of power in overcoming the frictional resistance of the river bed, in the grinding of shingle into sand and in the transport of sandbanks from one part of the river to another. Even the flow of the water through the sluices of locks involves a loss of energy, as does the working of a tide mill, which latter is one way of utilizing, as the others are of destroying, some of the earth's momentum. No true engineer will believe that, with so many sources of energy around us, the progress of mankind and the work of the engineer will cease with the exhaustion of our coal fields.

IN twenty-five years the total number of United States patents rose from 98,460 to 568,619. Of the latter number, electric generators claim 3,117; electric railways, 2,019; electric lighting, 3,622; electric power, 1,183; telegraphy, 3,205, and telephony, 2,459.

Electrical Progress.

AN interesting illustration of the utilization of waste water is afforded at the Ontario mine, Park City, Utah. After the completion of their great drain tunnel—more than three miles in length—which taps their lode at a depth of 1500 feet, it was found to have a continuous flow of 1000 cubic feet per minute. This water was piped down the canyon 1600 feet, where a fall of 125 feet was obtained. At this point the power station is located, embracing two Pelton wheels, connected with belt-driven electric generators. The power thus produced is transmitted six and one-half miles to the works of the company and there used for lighting the mine, mill and hoisting works, besides furnishing power for various purposes. The pole line runs over a very rough country at a high elevation, subject to heavy snowfalls and electric storms of great severity. Yet no interruption has occurred to the service, nor have any repairs been required during the two years that it has been in operation.

THE rapidity of the growth of electrical industries in the United States is illustrated by some recently published statistics. It is now only some seventeen years ago since the first electric central station was erected in America; now there are 2,500 separate electric light companies in existence, and in addition 7,700 municipal and other isolated plants. The capital invested in these is estimated at $500,000,000. These establishments are reckoned to require daily from 50,000 to 75,000 incandescent lamps, while they consume annually 200,000,000 carbons. Against the electric railways in Europe, under 100 altogether, there are now running in the United States about 900, covering 11,000 miles of track and representing a capital estimated at $100,000,000. All this has been the work of less than seventeen years.

PRESIDENT G. TRACY ROGERS, in his annual address before the New York street railway convention, said that the experience of the past year has demonstrated that where very long lines of street railways are to be operated, power can be economically delivered twenty miles or more from the power station by the three-phase system and the use of high-tension current. The experience of the past year has also demonstrated that with direct-current machines, longer lines than we had previously supposed can, by the addition of boosters, be operated economically. Some fifteen or twenty different roads in the United States are now using this system.

JOHN JACOB ASTOR'S yacht—the Utopian—the largest yet constructed, to be operated by electricity, was launched Sept. 10. Four hundred and eighty cells of battery are to be installed for the operation of two 25-horse power motors. It is said that the installment will carry power for fourteen running hours. The yacht is fitted with a system of bells, arranged so that the helmsman can signal aft, and will be lighted electrically. Her main dimensions are: 72 feet long over all, 12 feet beam and 4 feet draught.

MR. TROTTER, in a recent lecture before the South African Philosophical Society, says a London exchange, plunged a steel knife and a silver fork into an orange, forming a battery by which he was able to send signals over one of the long-distance telegraph lines to Port Elizabeth from Cape Town, including a resistance composed of a row of persons joining hands.

IT is reported that a company is to be formed in Sweden for the smelting of ores on a large scale under the De Laval patents for electric smelting. The Swedish Government has granted a concession for the establishment of the company, which will have a capital of £750,000. The water power at Trolhattan will be utilized.

ACCORDING to the London *Daily News* M. Kildischewsky, a Russian electrician, has discovered an improvement in the telephone, by the use of which distance has no effect upon the hearing. In a recent experiment between Moscow and Rostoff, on the Don, a distance of 890 miles, talking, music and singing were heard with perfect distinctness. An ordinary telegraph wire was used. It was said that M. Kildischewsky will go to London to experiment with his improvement on the Atlantic cables between London and New York.

Mechanical Progress.

The Chicago Tower.

The Chicago Tower Company, recently organized with a capital stock of $1,000,000, will erect on the West Side a tower 1150 feet in height—202 feet higher than the Eiffel Tower in Paris. The foundation will consist of four four-cornered supports, each 50 feet square, and meeting in an arch 200 feet wide and high. On top of these arches will be a vast landing 250 feet square and capable of accommodating 20,000 people. There will be six other landings, with a capacity of 20,000 more, each smaller than the one below. The topmost will be provided with a powerful searchlight and telescope. Sixteen elevators will carry passengers to the first landing, eight to the second, six to the third, and from there four cars will take passengers to the 1000-foot landing. A theater, restaurant, booths and exhibits of every description will occupy the landings. Electrical displays will be made from the top landing at night. Many other features will be added for the amusement of persons visiting the tower. The estimated cost of the structure will be $800,000. The annual income is expected to exceed $300,000 and the cost of management $50,000. Bathroom, barber and florist shops, delicacy booths and convention rooms are devised in the plans as means of revenue. On each landing will be telegraph and telephone stations. Fireworks exhibitions will be given and the concert halls are expected to afford considerable income.—Chicago Journal of Commerce.

ON the question of fenders the president of the New York State Street Railway Convention said the other day: "The question of fenders is still confronting us, and is a most perplexing problem. More patents for street-car fenders have been granted during the past few years than for any other class of inventions. It is stated upon good authority that there are upwards of 4000 on the market. It is the opinion of many street railway men that the fender is a menace. Your executive committee were anxious that an act be passed regarding fenders. There were a number introduced. The one introduced by the chairman of the Assembly Railway Committee seemed to meet the approval of the public and was heartily indorsed by your executive committee, but for some reason it never became a law. The street railways are anxious that the State should share some of the responsibility. I stated last year, and still believe, that the best fender for the front end of a car is a clear-headed motorman."

THE Commissioner of Patents, in his report on the business of the Patent Office for the fiscal year ending June 30 last, shows that 48,105 applications and caveats had been received, 24,585 patents granted and trade-marks, labels and prints registered, and 15,580 patents withheld and patents expired. Receipts from all sources during the year were $1,307,090 and expenditures $1,097,368, leaving a surplus of $209,721. The balance in the Treasury of the United States on account of the

patent fund on June 30, 1895, was $4,566,757, making a total, with the 1896 surplus, of $4,776,479. Applications awaiting action number 8943.

THE Trans-Mississippi and International Exposition will be held at Omaha in 1898, for the conditions of the $200,000 national appropriation have been met. In that city, it is said, $313,000 worth of stock has been placed, $40,000 additional is in sight, and such subscriptions as $10,000 from Chicago, and those of 5000 individual stockholders, make the amount set—half a million dollars—assured. Fifty directors and a working force will be appointed on the first of October.

NEARLY every article representing an important part of the basis of material for the operation of industrial establishments in this country shows a very great increase in excess of the gain in population during the past ten years, says the Chicago *Journal of Commerce*. From 1885 to 1895 there was a gain in population of 25 per cent, while the general average gain of production of pig iron, coal, copper, zinc and lead was approximately 50 per cent.

Practical Information.

The Naval Academy and Education of Engineers.

The charges filed by Capt. Cooper, superintendent of the United States Naval Academy against Commodore Melville, the engineer-in-chief of the Navy, it is understood are based on statements made by the engineer-in-chief in an article printed in the *North American Review*, in which the words occur: "Annapolis is either unable or unwilling to train naval engineers, and, if its work is brought into comparison with that of other institutions, the naval academy will be compelled to extend its engineering curriculum or show cause for its existence." As to the official standing of the report of the superintendent, it may be said that the United States Navy regulations require officers of all grades to obtain the permission of the Secretary before giving their views in print. That this permission was given in this case does not admit of doubt, and, since the publication of the article was thus authorized, no charges founded upon it would seem to carry weight, especially with so impartial an official as the present Secretary of the Navy.

Moreover, the propriety of the views of the engineer-in-chief is beyond question. The institution at Annapolis had at one time a notably thorough engineering course. In recent years, however, there has been a change. The special course of four years for cadet engineering has been abolished; all cadets receive the same instruction for three years, and it is only during the fourth and last year that professional studies are pursued by the cadets transferred at that time to the engineer division. The reason for this change, in a navy which has become wholly engineering, can be only that indicated by a candid officer of the line, who is reported to have said: "The engineers were getting so many able men that we had to stop it, otherwise as they came over one gangway they would have driven us over the other. It seems to have been a question of the preservation of the prestige of the line branch."—Cassier's Magazine.

IN the *Annales de Micrographie*, M. Miquel gives statistics for ten years of the numbers of bacteria in a cubic meter of air, both in the center of Paris and in the park of Montsouris. In consequence of local improvements, the air in the park has gradually become purer, the number of bacteria having decreased from 480 per cubic meter in 1884 to 275 in 1893; but the air in Paris itself has increased in micro-organisms from 3,480 in 1884 to 6,040 in 1893. This large increase, M. Miquel attributes to the greater cleanliness of the inhabitants, who, by dusting out and cleaning their houses and shaking carpets, etc., stir a large quantity of germs into the air. He even goes so far as to condemn this form of cleanliness, on the ground that the germs are simply blown about by the wind, and find their way into the house again, so that if you do not get your own germs back, those from your neighbors fly in at the window instead.

IN no other country is the railroad mileage near as large relatively to the number of inhabitants as in the United States. The chief nations of Europe have one mile of railroad to an average of 2600 people, while in this country the average is 380 inhabitants to one mile of road. This is the result of the competition between different railroad companies. In Iowa, where the fight is perhaps bitterest, the number of inhabitants to one mile of road is only 243; while Germany, with very nearly the same amount of mileage, has 1895 inhabitants to the mile—a number nearly eight times as great.

FOR many years, during the time that rag paper or straw paper was the standard, Great Britain stood at the head of the world's producers and manufactured not only sufficient for the home demand, but also had a surplus left over for export, whereas the American product of paper was insufficient for home demand. With the discovery of the utility of wood pulp for paper making and the process whereby the cost of paper has been reduced, the United States has been steadily pushing ahead and are now in advance of Great Britain. Germany follows Great Britain closely.

A COMPARISON of the teeth of dwellers in granitic and calcareous districts establishes the fact that the worst teeth of the calcareous districts are always better than the very best teeth found within the non-calcareous districts.

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Wonderful Development of the Camp Floyd Mining District.

The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1890 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis. The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City.

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J. H. Weddle, Leadville, Colo.
C. E. Finney, Argentine, Kan.

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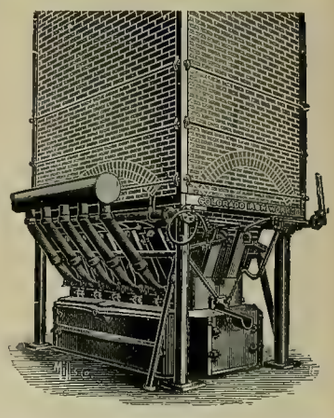

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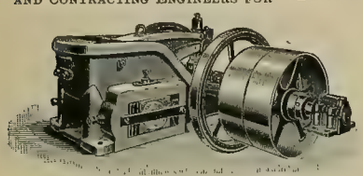

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPTEMBER 22, 1896.

568,152.—SLIDING DOOR—H. C. Asbenfelter, Spokane, Wash.
568,013.—CIRCUIT CLOSER—T. R. Barney, S. F.
567,977.—CENTER BIT—T. F. Hagerty, S. F.
568,111.—BOUQUET HOLDER—J. M. Johnston, Los Angeles, Cal.
568,067.—WRENCH—B. E. Keed, Los Angeles, Cal.
568,141.—TRACK JACK—P. Larkin, San Jacinto, Cal.
568,037.—BOTTLE—W. H. McDonald, Redlands, Cal.
568,004.—GANG PLOW—S. H. Miller, Stockton, Cal.
568,318.—WATER PIPES—J. Morhard, S. F.
568,095.—THERAPEUTIC ELECTRODE—J. S. Muir, Stockton, Cal.
567,992.—BRAKE SHOE—W. Myers, Ruby Valley, Cal.
568,269.—FLOWER HOLDER—A. J. O'Neal, S. F.
568,271.—SKYLIGHT RAISER—G. M. Parsons, Carson, Nev.
568,100.—PLOW AND SEEDER—J. Porteous, Fresno, Cal.
568,150.—POISON DROPPER—W. Williams, Wilbur, Wash.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

COMBINED PLOW AND SEEDER.—James Porteous, Fresno, Cal. No. 568,100. Dated Sept. 22, 1896. This invention relates to that class of agricultural implements in which the parts and functions of a gang plow and a seeding machine are combined. The object of the invention is to simplify the combination by an intimate union of the parts performing the two general functions, providing a distinctly single implement and one which employs drills arranged to the best advantage for simplicity of construction and effectiveness in operation. The implement consists of a plow frame having its plow bottoms arranged in a line inclined to the line of draft, a seed-box supported on said frame and provided with suitable discharging mechanism, drill shoes arranged in a line parallel with the line of the plows, flexible conveyors from the seed-box to said shoes and colters or shares of said shoes, the arms of which extend up to and are pivotally connected with the plow frame.

THERAPEUTIC ELECTRODE.—John Severn Muir, Stockton, Cal. No. 568,095. Dated Sept. 22, 1896. This invention relates to the class of electrodes used in the administration of electricity for therapeutic purposes. The device consists of an electrode composed of a backing of leather, cloth or any other suitable material which is a non-conductor of electricity. To the face surface of this backing is attached, by stitching or cementation, a flexible sheet of metallic or semi-metallic electro conducting material, and on the face surface of tis sheet of metallic or semi-metallic substance is spread a pliable compound containing as part of its composition an electro-conducting substance. The general object of the invention is to provide a durable and perfect therapeutic electrode which is adapted to be readily applied to any portion of the body, fitting it perfectly throughout its entire surface, and so constructed that it can be used dry, avoiding the necessity of moistening or wetting it, said electrode being adapted to distribute the electric current equally and smoothly over that portion of the body to which it is applied, and on account of its even distribution of the current, permitting the use of much larger currents than by other forms of electrodes.

Coast Industrial Notes.

—A scheme is on foot at Los Angeles to build an electric railway from that city out to La Canyada valley.

—It is reported that the entire catch of seals in Bering sea the past season will not be half that of last year.

—The U. S. monitor Monadnock anchored last Sunday in Humboldt bay—the first warship that ever entered that harbor.

—The steamship Hupeh, which sailed for the Orient last week, carried away one of the largest flour cargoes that ever left for China and Japan, the total amount being over 30,000 barrels, valued at $84,577. It also carried 8306 bushels of wheat, valued at $4485, for Nagasaki and Kobe.

—The Puget sound sawmill proprietors have made a $100,000 contract with Japanese concerns for supplying 12,000,000 feet of lumber, to be shipped at once to northern Japan. The steamship Konoura Maru, which is to transport the first consignment, 1,800,000 feet, has arrived at Seattle.

Personal.

CAPTAIN COUCH has returned to Butte, Montana, from England. He did not go to South Africa. It is said by a Boston paper that he will return to this State to take charge of the Merced properties.

CAPTAIN THOMAS MEIN, who has returned here after four years' absence in South Africa, will look after the interests of the Exploration Company on this coast. These include the Oneida mine, properties at Minas Prietas in Mexico, the Steeple Rock properties in New Mexico, mines in southern Oregon and an interest in the Alaska-Treadwell mines.

E. B. DORSEY, formerly a well-known mining engineer on the Comstock where he built the old Mexican mill, returned to this city last week for the first time in seventeen years. He is residing most of the time in London and has come out here in the interest of some capitalists to look up mining properties.

THERE have arrived in Butte, Montana, two men from Paris, Emil du Marias and Emil P. Euders, who came out, it is understood, under the auspices of the French Government to make a general report upon mining districts of this country and British Columbia. Some years ago they made a tour of the South African gold fields for the same purpose.

Recently Declared Mining Dividends.

Cedar Canyon Mining Company, British Columbia, $24,000, payable Sept. 1st.

Homestake Mining Company, Deadwood, S. D., $31,250, payable Sept. 25th—a total of $5,993,750 to date.

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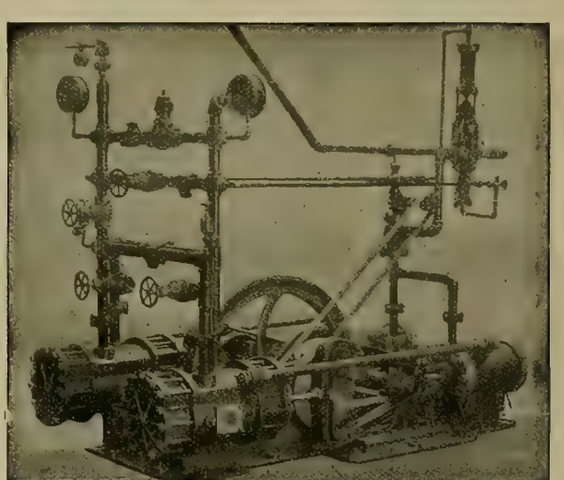

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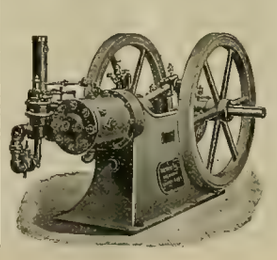

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Mining Summary.

CALIFORNIA.

Amador.

Republican: There are fifty-two men employed in the Union mine at Pine Grove, and as soon as the improvements on the 30-stamp mill are completed a number more will be added. The shaft is down 400 feet, and the ledge improves as they go deeper.

At the Kennedy mine the new level opened up at 2150 feet has encountered the ore body and it is found to be equal in size and fully as rich as that worked in the 1950 level.

At the Anita mine the east drift at the 500-foot level has reached a point 40 feet from the shaft. The face is in a slatey formation, indicating a near approach to the ledge. It was calculated that between 40 and 50 feet would suffice to tap the ore body.

The old Dane mine, just below the Reward, is being opened up.

Ledger: The first section on the new hoist at the Oneida is in position and work is progressing on the second section. The shaft is now down about 430 feet and harder rock has been encountered, but it breaks better, so the month's work will be about the same as last, 50 feet.

The Blue Lakes Company have a force of twenty men at work on the power site near Tripp's, on the Mokelumne river.

The Boston mine has shut down pending necessary development work. They have been operating through a single-compartment shaft and have concluded to increase its size. They have placed an order for timbers to construct 800 feet of shaft, and when that is on the ground they will probably renew operations.

Republican: In the Pioneer district Mason & Griesbach have cleaned up after a 250-ton run in the Gracey mill with ore from the Madrone mine. They intend crushing again in October.

Chase & Hawkins are doing development work on a claim they have bonded on Pioneer creek.

The White brothers are working a large force of men. They have been delayed in the preliminary work.

The Pinnavita is still taking out rock. The sulphurets in this vein run very high. They expect to crush a 50-ton lot in the Gracey mill in a short time.

Taylor & Atkinson have a large dump of good ore. They also propose crushing in a couple of weeks.

The Contention, or old Belden, is still lying idle, although report says it will start up soon.

Chicago parties are negotiating for the Madrone mine; also, Casinelli's group, including the Pioneer.

At Sutter Creek, Prince Geo. Greancaux, a recent arrival from France, is consulting with Senator Voorhies in relation to mining interests on the mother lode.

There is talk of starting up the Farrell mine and mill on the Mokelumne river. This is the last mine on the mother lode in Amador county, and has been idle for some time.

Butte.

At the Forty-nine mine, on Red Point mountain, near Forbestown, one of the properties of the Oregon Gold Mining Company, a new ditch is being constructed from the Forbestown ditch to the top of the mountain, to convey water for generating power for the mine. The upper tunnel has exposed a ledge 31 feet wide, the ore of which will average $8. The lower tunnel is being pushed ahead to reach the same pay chute at a depth of 32 feet, and it is expected to strike it within 100 feet. The owners will begin the erection of a mill as soon as this tunnel determines what size it should be.

Register: Near Enterprise James O. Carlisle has reached in his mine, the Betsy, a rich body of ore.

Shaw & Co., the owners of the Golden Fissure mine, are preparing to build a new quartz mill on their property, the ledge having shown good rock since its development.

E. Otto Miller has for seven years been mining on Main Butte creek and at times has made as high as $30 per day to the man. The mine has paid for all development work and has paid the owner good wages during the entire time.

Register: At Forbestown the force has been withdrawn for the present from the Goldbank tunnel, but these men are working to reach the ore in the Golden Queen mine which will be crushed in the Goldbank mill.

The Missouri mine has been bonded and not less than $15,000 will be expended in opening and working it.

A deposit of good quartz has been found in the Denver mine and the mill was started up on this rock last week.

The ledge in the Betsy mine owned by J. O. Carlisle is from 15 to 20 feet wide and shows up well.

Calaveras.

Angels *Voice*: A deal has been consummated by W. C. Ralston on the Malones property at Carson Hill. Eastern capital will at once take hold and work the property. The Melones group includes the Reserve, Point Rock, Mineral Mountain and Melones proper. It is expected that the ledge will be worked from both Carson Hill and Robinson's Ferry.

Mountain Echo: At the Gold Hill mine at Smith's Flat it is the intention to put the shaft down 500 feet before running any levels.

It is reported that operations have ceased at the Bear Mountain mine, the men having quit work because their pay for labor was not forthcoming.

Chronicle: A cleanup made at the Roanoke mine last week from a run of twenty days with the 20-stamp mill yielded $10,000. Work at the mine is going steadily on and good ore is being encountered.

Some good gravel is being taken out of the Rising Star mine near Central Hill. A shaft to tap the channel was sunk, and at a depth of 130 feet the gravel was struck, which it is said will yield $4 to the ton, and the depth is not known, as bedrock has not yet been reached. A new hoist and other machinery are soon to be put on the ground.

Citizen: All the timber and machinery for the new 40-stamp mill at the Gwin mine is on the ground, and the mill is well under way. Captain F. F. Thomas says that the stamps will be dropping by the 1st of November.

A rich body of gravel was struck at Central Hill last week.

Sinking on the Ghost mine at Angels is progressing steadily.

It is the intention of the management of the Gold Hill mine at Smith's Flat to sink the shaft to a depth of 500 feet before running levels.

The old Petticoat mine at Railroad Flat is about to start up under the management of W. H. Clary, Jr. A hoist is being erected and other work being done preparatory to cleaning out the old shaft.

The Ford Mining Company have purchased a new 50 H. P. boiler for their mine.

The California Debris Commissioners have granted the owners of the Aleyone mine near Angels permission to build restraining dams across San Domingo creek—a tributary of the Calaveras river.

The owners of the Barnhardt mine near Old gulch have completed their restraining dam according to the instructions of the Debris Commissioners, and are awaiting the inspection of the work by the engineer of the Commission.

El Dorado.

(Special Correspondence).—A rich ore body of good size was discovered last week in developing the Marguerite, three miles south of town. This property adjoins the Larkin on the east.

Work is progressing rapidly on the Griffith Consolidated. The new hoist is about completed and the shaft will soon be clear of water and retimbered.

The machinery for the new mill on the Baltic is all on the ground and will soon be in operation.

The framework for the new mill on the Larkin is almost completed. The hoist is finished. The underground work, shaft and drifts amount to something over 500 feet.

John Ewarts has begun a tunnel one mile south of town on a drift property which he expects to operate on a large scale during the coming winter. This will be known as the Eureka mine.

In the Zantgraf, twenty-five miles southwest of Placerville, they are running twenty stamps and employ sixty-five men. It is claimed that this mill has the heaviest battery timbers in the State. The stamps weigh 1000 pounds. There are 1900 feet of tunnel, 1400 feet of levels, a 530-foot shaft and a 2¼-foot ledge. T. F. Chapman is superintendent.

Three representatives of English capitalists were in town last week and made examinations of as many properties. If satisfactory arrangements can be made for prices and funds the negotiations will be closed before long.

N. G. Sturtevant & Son are making good progress on their property near El Dorado. They find a good ore body of fair grade quartz.

Placerville, Sept. 27, '96.

Kern.

Californian: Sixty-five tons of Randsburg ore has been cleaned up in the last ten days. A run made for the James Bros., Garlock & Simpson netted about $75 per ton.

The Amalie mine, owned by W. E. Rogers, is said to be turning out a silver bonanza. The new hoisting works are now in operation, and rich ore is being taken out on the 300-foot level.

Madera.

(Special Correspondence).—At Grub Gulch mining matters are lively and show more promise than for many years past. Within 30 to 60 days several large properties that are now inoperative for lack of water will resume work. With the cooler weather water is on the increase. Springs are yielding more freely and the Fresno river is beginning to run a little stronger. Grub Gulch is 12 miles from Raymond on the S. P. R. R., over one of the best mountain stage roads in the State. It is a prosperous little camp. There are at present no idle men, but all demands for labor are fully supplied. Wages are $3 a day for miners and $2.50 for men above ground.

The Gambetta mine, Gambetta G. M. Co. owner, is situated about one-half mile west of Grub Gulch. About 30 men are employed. There is a mill, hoisting plant, ore concentrators, etc. The principal value of the ore is in the sulphurets which are high grade. The vein is small but rich. The main working shaft is down 400 feet. Below the level a winze is sunk another 100 feet and the rock is now being taken from the 500-level. The plant is driven by steam power. There is plenty of wood in the district, which costs about $3.50 a cord delivered. Mining timbers run from 5 to 10 cents per lineal foot, while lumber is quoted at $17.50 per 1000 feet, board measure, delivered.

The Mammoth mine, Mammoth G. M. Co. owner, is about half a mile northeast of Grub Gulch. It is closed down at present but everything is being put in order to resume operations at once. Upwards of $65,000 has been spent on an electrical power plant which works to perfection. The water for the generation of the electrical power is taken from a dam in the Fresno river at a point about four miles above Grub Gulch and thence by ditch and flume to the power house. At the power house there is a wheel and pump which raises water to a tank on the side of the mountain. Here there is another pump, worked by electricity which pumps the water over the mountain to the mine. There is a good 10-stamp mill, concentrators, pumps, hoisting plant, etc.

The Starlight is an extension of the Mammoth and is now opening up well. About 12 men are employed mostly in sinking. They have exposed a vein of from 8 to 10 feet in width, of good milling rock. A first-class new hoisting plant has just been completed.

The Savannah mine, Charles W. Haskell, superintendent, is 2½ miles east of Grub Gulch, on an extension of the Mammoth lode. There are three shafts from 175 to 300 feet in depth, all showing fine ore. The Savannah ground comprises four full claims. There is a 10-stamp mill, concentrators, hoisting plant, air compressor, rock drills, etc., and the number of stamps is to be doubled shortly. The motive power is water from the Fresno river, and at present owing to the low state of the river the mill is shut down. It will be running again before the end of October.

Altogether there are over twenty locations on the Mammoth lode and there are some very favorable prospects outside of the principal mines mentioned. It is a contact vein, slate in foot wall and granite in the hanging.

The Potter Ridge mining district is five miles east of Grub Gulch. The most northwesterly location is the Enterprise group, where with a 10-stamp mill the Enterprise G. M. Co. are said to have turned out over $2,000,000. At present it is closed down awaiting the introduction of heavier plant. The depth reached is only 600 feet but the machinery on the ground is too light for the work.

To the eastward and on the same vein is the Syndicate group, which with an arastra is said to have produced over $50,000. This property was better known as the Lucky Bill, when owned by Sheriff R. A. Prouty of Mariposa and others. For four years but little work has been done. It has this month been bonded to John S. Wilbur of San Francisco, and work will be commenced by a stock company within 30 days. At 100 feet there is a vein running northwest and southeast, and over 12 feet in thickness in walls of slate. This vein is said to average from $18 to $24 a ton. A 10-stamp mill and complete equipment is to be erected at once. Water power from the Fresno river will be used, the dam and ditch having been already constructed. From the mine to the mill site is about 3000 feet with a fall of about 700 feet. The ore will be transported by a gravity road. All the conditions are favorable for economical working, and the cost of mining and milling should not exceed $3 a ton at the outside.

Considerable interest is taken in operations at the Buckskin, a new prospect to the eastward of the Syndicate group, and located on the same vein. Eleven locations have already been made on this vein, so far as it is prospected. At the Buckskin the croppings have assayed as high as $120 per ton, and an average of a number of assays gives about half that amount.

Grub Gulch, Sept. 28, '96.

Mariposa.

(Special Correspondence). — The Mariposa Electrical Power Company have men at work on the aqueduct below the Broadhead dam. Charles T. Lindner, the general manager, is daily expected on the ground, to put more men on the work. Several mine owners have entered into contracts to use the power at the rate of $5 per H. P. a month, the power to be installed at the expense of the company.

The Bunker's G. M. Co., W. B. McSherry superintendent, are carrying on considerable operations about five miles southeast of Coulterville. The directors of the company propose to erect a 10-stamp mill at once. They have a quantity of very good looking rock awaiting crushing.

The Tyro mine is crushing rock from the 700-foot level that averages over $20 a ton. Joseph Buttgenbach, the president of the company, has made a contract with the Mariposa Electric Power Company and is about to increase the number of stamps from ten to twenty.

J. J. Dolan has taken a working bond on the Warren mine at the back of Date's Flat, near the head of Gentry's gulch.

J. Adams has bonded his claims north of the Louisiana, on the north fork of the Merced river, to J. C. Donaldson, C. E., formerly of Australia. Till recently Mr. Donaldson has been assistant engineer on the Valley Railroad. He has opened up the Adams claims in a number of places, exposing a strong, well-defined vein of good milling ore. This may become a large tunneling proposition, well adapted for economical working, as by driving from the north fork, in which there is sufficient water for power, about 1000 feet of backs could probably be obtained.

At the Louisiana, A. C. Cable superintendent, the shaft is down over 200 feet. No drifting has yet been done. About thirty men are employed. The mine is to be thoroughly prospected to at least 500 feet before a mill is put up. Operations here are on a model of scientific, economical and systematic mining.

The Bondurant mine, C. F. Bruner superintendent, is bonded to F. E. French, treasurer of the Boston-Mariposa G. M. Co. Beyond keeping the pumps going and taking a few samples for mill tests, no work is being done.

At the Reynolds mine, James S. Reynolds in charge, the Richland G. M. Co. of San Francisco is carrying on development work by drifting on the 100-foot level. They are working on a vein from 2½ to 6 feet wide that is said to average about $15 per ton, and appear to be well satisfied with their prospects.

At Pinon Blanco little work is being done pending the return of Captain A. H. Ward, who is in New York in connection with the affairs of the Mariposa Electric Power Company, of which he is president.

The owners of the Sellick mine at Haywards—Messrs. Sellick, Elliott & Clapp—are in San Francisco, arranging for new machinery. They are expected back next week, by which time Mr. Hensley, the superintendent, expects to crosscut the ledge in the main shaft.

Angus Mackintosh, who recently bought the Hayseed and Triumph mines from the Messrs. Helms at Whitlocks, is in San Francisco, buying machinery. On Mr. Mackintosh's return work is to be started up in good shape.

Charles E. Stuart, at the Dorse mine, near Hornitos, is now down over 300 feet, and keeps on sinking. He is apparently well satisfied and has bought the mine, which was previously worked under a bond.

Messrs. Goodall, Perkins & Co. have begun work on the Barrett and New York claims in Hunter's valley. It is a tunneling proposition and they have sent up rails, cars and other material necessary for a big lot of tunneling.

Coulterville, Sept. 30, '96.

Gazette: William Doolittle of San Francisco has bonded the Geary mine, on Whitlocks, and another mine in the same neighborhood, and has commenced to work them.

Nevada.

Telegraph: The Pennsylvania mine has developed a large vein of good ore.

Tidings: A new 10-stamp quartz mill has arrived at Nevada City for the Cadmus mine. It will be erected without delay.

The Gold Hill Mining Company have leased the Rogers mill and are now putting it in order. The mill will be run by electricity and the necessary machinery has already been ordered.

Placer.

Colfax *Sentinel*: At the Mayflower it is believed that the old upper Paragon lead of gravel has been struck at a point 178 feet on the upraise which the company has been running.

Plumas.

Independent: At the Thistle Shaft drift mine about seventy-five men are employed, putting out from 275 to 300 loads of pay dirt a day. This force will be increased as soon as the work of retimbering a portion of the shaft, which will be commenced next month, is completed. The company owns over six miles of ground along the Gibsonville ridge.

An incipient mining boom has been making its presence felt on the hills back of town.

San Diego.

Los Angeles *Times*: Mat Wormer, a prospector, is reported to have uncovered a vein of tellurium ore four miles below Cuyamaca Dam, on Boulder Creek, samples of which show well in gold.

Shasta.

Free Press: James Eligh and Louis Reel are about to sell the Banghart mine at Whiskytown. They own together 7500 feet of mining ground in placers and seams. These seams have been prospected 100 feet deep and proven rich. The proposed purchasers will make many improvements.

Sierra.

At the Sierra Buttes No. 2 the new 10-stamp mill will be running in about two weeks. There is a 30-foot ledge in sight, from which stoping will begin in a short time.

Enterprise: A large force of men is being employed at the North America and Bunker Hill mines, where recently a large block of undeveloped ground was worked with a yield of $12,000.

Siskiyou.

Journal: The Columbia mine, near Scott Bar, has been producing ore the past few months, and the crushing which that company have had at their mill on Mill creek has given them good results.

Chamberlain & Timmons will soon commence crushing with their new mill on Mill creek. They now have over 200 tons of quartz on the dump, and the mill will be kept running until they have it all crushed.

The Nebraska mill, on Cherry creek, which was shut down a short time ago, will probably be started up again before long.

The Klamath River Dredging Company have been working near Oak Bar for some time past.

The 5-stamp mill, which was erected at the big quartz ledge on French creek some time ago, will be taken to a smaller ledge belonging to A. Erno.

The miners along the Klamath are doing good work and will continue until the cold weather drives them out.

Tuolumne.

Union-Democrat: At the Punter they have stopped sinking and are now drifting north of the shaft on the 140 level. At the face of the drift there is a good ore body, upon which considerable work of exploration will be done.

At the Confidence the big pumps have cleared the mine of water and the work of exploring the ore bodies is being pushed.

At the Jumper nearly sixty tons per day is milled and the payroll amounts to $8000 per month. The ore coming from the New Era drift is high grade.

Frank Enzensperger has started work on the North Star for his Salt Lake and Denver company. A shaft will be sunk this winter and considerable development done.

In the Alameda the upraise being driven from the tunnel to the surface, a distance of 231 feet, will be through in about two weeks, when an incline shaft will be started and sent down 400 feet. Levels will be driven every 100 feet and the claim opened up.

At the App the water is now down below the 800-foot level, and for the first time in years the mine is dry. The ore chute on the lower levels is stronger than above. The new air compressor is running.

The new cyanide plant at the Black Oak is giving satisfaction in treating the ores from that mine.

Work on the Eagle tunnel has been resumed and will be prosecuted until a connection with the Shawmut is made.

NEVADA.

The Golden Eagle Company proposes to erect a concentrator on its property in Hum-

boldt county this season. The mine shows a good body of ore that carries $20 in gold and twenty-five ounces silver.

At the Dexter mine in Tuscarora $8000 worth of bullion was the product of the cyanide plant from an eight days' run.

White Pine *News:* Orson Hudson and Frank Kell, in a recent clean-up from their placer diggings, in Osceola district, took out $800, the result of twenty-four days' run.

Reno *Gazette:* At Austin the citizens are awakening to a new era owing to the big strike in the new tunnel that is being run under the old mines near Austin. The projectors of the tunnel have struck rich ore and the work is being pushed with all the speed possible. A 20-stamp mill is being built to work the ore. It is of a rebellious character and will be hard to work.

OREGON.

Democratic Times: The new road into the Bohemia mining district is almost completed, and will be finished in a few weeks.

Capital is being interested in the development of the deep gravel deposits west of Waldo.

A force of men are at the Illinois copper mines getting the smelter ready for operation.

Jones & Otten of Woodville are running the Hammersly mine and have twenty-two men employed.

BRITISH COLUMBIA.

A Victoria syndicate has purchased of S. McKay and J. Glass the Picnic and Eclipse, two properties on Deer Park mountain, for $25,000 in cash.

Spokesman-Review: The Trilby mine, which lies to the east of the Maid of Erin, at Rossland, has been sold to John P. McMartin for $10,000 cash. Mr. McMartin has also purchased for cash the Prince of Wales, still farther to the east, and adjoining the Southern Cross claim.

North and Govan, representatives of an English development company, have bonded the Prospector group, which consists of the Prospector, Little Flo, Victoria and Handy claims, situated on Porcupine mountain. The purchasers bind themselves to expend $5000 in development work at once, and to pay the vendors $150,000 within a year.

The owners of the Galena Farm, east of Slocan, contemplate the erection of a 200-ton concentrator in the near future.

The new shaft house of the Nickel Plate is completed and ready for the machinery.

The Crown Point is shipping fifteen tons of ore daily and the War Eagle is shipping forty tons to Trail.

Spokane *Chronicle:* A California syndicate has offered $40,000 for the Silver Bell on the south fork of the Slocan, but it was refused.

The Wild Goose group in the Slocan has been bonded by Evans, Coleman & Evans for $40,000. The group includes the Corinth and several other claims.

The Thompson group on Five-Mile creek has also been bonded by English parties for $40,000.

The Carnation, situated just above the Kuth at Sandon, has been sold by Hugh Mann for $10,500 to the Mitchells of Winnepeg.

E. H. Tombinson and Dr. W. A. Hendryx are to consolidate their Slocan mines in a corporation to be known as the Last Chance Mining Company. The company property will consist of more than a hundred acres of solid ground extending from Noble Five camp westward to the R. E. Lee and northward to the Northern Belle and Antoine mines. The Last Chance has shipped over 500 tons of high-grade galena ore and has several hundred tons blocked out in the mine to be shipped when rawhiding begins. A lower tunnel is now in 250 feet, that, when completed at about 1500 feet, will give 600 feet in depth on the developed veins.

UTAH.

Tribune: Surveyors are on the Northern Light at Ophir, preparing for the construction of the projected mill. It is understood that it is to be completed by January 1st and that there is now blocked out in the mine ore enough to run the plant for an indefinite period.

A Chicago syndicate has purchased of E. J. Carter 200,000 shares of stock in the property of the East Golden Gate Mining Company at Mercur.

At American Fork canyon, on the Live Yankee, of which it is said that its output last year amounted to over $50,000, there are now but two men employed; nor is the force likely to be increased until the litigation which is now on is disposed of.

Tribune: J. C. Taylor has secured a lease and bond on six claims on Silverado mountain, assays from which show as much as $25 in gold and 91 ounces in silver. The pay streak is small, but the formation is identical with that which prevails in neighboring claims that have been productive of large amounts of high-grade ore.

Tribune: A project is being agitated for the drainage of the mines of Alta and the systematic exploration of levels below the watermark. The fortunes that rewarded the pioneers were all taken from levels above it, the owners suspending operations upon encountering the warter. This was so with the Flagstaff, the Emma, and the case of all the others. The project has in view the putting in of a tunnel from a point between the Emma mine and Wasatch. Such an undertaking means the expenditure of a large amount of money, but those who are urging it believe that below the water there will be found a higher grade of ore than was mined above. It would materially reduce the cost of transportation between the mines an the railway.

O. G. Elking is working gold placer mines at West Water. He works with a small hydraulic ram and uses magnetized plates. Last month he and three companions earned $300 apiece from the placers. They will largely increase their machinery and force of workmen in October.

At Mercur, C. H. Scheu continues development of the La Cigale group, in the western foothills, and has just let another contract for 50 feet of sinking, which will give a depth of 200 feet.

The Sunshine continues to put out a very good class of ore, and the opinion is expressed that it will become one of the most productive in the camp.

The Marion is providing means for converting its cyanides into bullion at the mill and in a short time will be sending the earnings direct to the mint instead of a refinery.

At Tintic, a new strike of ore is reported in the west drift from the 200 level of the Ajax. A small sample of ore taken out a few days ago showed 73 per cent lead.

Shipments for the week were as follows: From the Bullion-Beck mine, 25 carloads ore; Centennial Eureka, 9; Gemini, 4; Ajax, 10; Utah, 4; Sioux, 5; Swansea, 4; South Swansea, 5; Sunbeam, 1; Buckeye, 1; Dragon Iron mine, 2 carloads ore daily.

IDAHO.

In the Campbell tunnel, in the Standard mine, in the Cœur d'Alenes, a strike has lately been made of what promises to be a large ore body.

Wood River *Times:* The indications are that an important quartz mining district will be opened up at the Cold Springs, six miles below this place. Several locations show good free gold ore on the surface, and the hanging walls are porphyry.

Spokesman-Review: In the Elk City country, one of the old placer camps which has been until two years ago practically deserted, the placers are attracting considerable attention, owing to the operations of the Idaho company, a syndicate of Chicago capitalists, who are operating the American Hill placers. The Buffalo Hill is also being worked by a syndicate of Butte men.

Silver City *Avalanche:* Feour & Gearhart have sold the Humboldt group of mines on Florida mountain to a company organized in Pittsburgh, Pa.

The following is the return reported for the month of August for the De Lamar Mining Company: Crushed during the month, 4357 tons of ore; bullion produced in the mill, $65,098; estimated value of ore shipped to smelters, $4300; miscellaneous revenue, $300; total product, $69,698; total expenses, $43,990; profit for the month, $25,708.

Articles of incorporation of the Independence Mining and Milling Company, Ketchum, have been filed. The capital stock is $500,000, all of which is subscribed.

Spokane *Chronicle:* The Tiger and Poorman mines at Burke are closed on account of the fire which burned out their mills last year. The mills at present are being rebuilt, but work will not be resumed upon the mines while the present prices for silver and lead continue.

A rich body of ore has recently been struck in the Mammoth mine.

The Helen and Frisco have a shaft down 400 feet below the tunnel level and extensive workings both ways from the shaft.

The Morning and You Like mines are producing large quantities of concentrating ore.

The Gold Hunter struck a fine body of ore and that property is looking better to-day than ever before in its history.

The Last Chance and Bunker Hill are both being operated, but it is doubtful if they can continue to run much longer.

MONTANA.

Butte *Miner:* Superintendent Josiah Gilbert of the Boston and Montana states that a rich 4-foot vein of ore has been struck in the Atlantic shaft.

The Drum Lummon is now being worked at a depth of 1800 feet and is producing well for the stockholders who bought it for a million dollars.

There is a report that the Broadway group of mines at Silver Star have been purchased by F. Aug. Heinze of Butte, and that he will start up the Broadway mine with a large force of men on Oct. 1.

Inter-Mountain: It is estimated that W. A. Clark has already shipped $100,000 worth of gold ore from the Mayflower mine since he purchased it a month ago for $150,000, and reliable mining experts estimate that there is at least $150,000 worth of ore in sight at the present time.

SOUTH DAKOTA.

Black Hills *Times:* The power drill on the Dacy shaft has been put in operation and the shaft is now 50 feet deep and will be sunk to the 150-foot level.

The Horseshoe Mining Company has encountered a fine ore shoot in their Troy shaft at a depth of 190 feet. It is presumably the lower ore contact, but this will not be determined until the shoot is passed through.

The owners of the Hailstorm property on Spruce gulch have resumed work on their vein at the point of original discovery and are now taking out ore worth from $50 to $80 per ton.

Supt. Franklin R. Carpenter has decided to resume operations in the Union shaft, sunk by him to develop the Emma and adjoining groups of claims situated on the siliceous ore belt.

The Harney Peak Tin Mining Company have had two men at work for some time prospecting for gold-bearing ore veins. They are working at present near Samelias and Golden Slipper properties at the northern end of the Harney Peak ground.

The upper ore contact recently discovered on the Tornado group has been opened at various points on the surface and its continuity proven for a distance of about 800 feet east and west and 400 feet north and south, and is evidently the same contact that is exposed in the Fannie shaft at the 80-foot level and in the Tornado workings.

Ore assaying $76 gold per ton has been discovered on the surface of the Golden Summit lode, situated on the Poorman divide.

The Highland Chief Mining Company have received all the machinery and castings for their new mill.

COLORADO.

Denver *Republican:* At Idaho Springs, on account of a big strike in the Sun and Moon property, the force has been materially increased. In extending the level at 160 feet a big body of galena ore commenced opening out and is now 3 feet in width. It is solid mineral and all smelting.

The Shafter mine has also increased its force. The shaft was recently sunk and large bodies of mineral were cut. Men are now at work developing these ore chutes.

Green Brothers, operating the Kinda mine on Fall river, have opened up a big body of low grade ore.

At Cripple Creek the Alice, on Raven hill, is being developed by Omaha people. The shaft is down 187 feet and at 200 feet new levels will be run. A pay body of ore has been blocked out, but the first object is to prove up the ground, and no effort is being made to produce.

The dead work done on the Union Gold properties for the past six weeks has put it ahead of the stopers again, and the new ore seems to guarantee steady production.

One of the principal ore buyers in camp says that so far this month the business of his sampler had been the best in its history, both the amount and value of the ore purchased having exceeded that handled in the banner month of last year, and that in spite of the fact that while there were but two smelters in the district last year there are now five large ones and any number of smaller concerns to divide up the business. Another feature is that the mines from which the ore is now being bought are nearly all new ones. The old customers of last year now produce in such quantities that they ship direct to the smelters, while the new and last opened have taken their places as patrons of the samplers.

Since taking hold of the Geneva, on Gold hill, Tutt & Penrose have done 490 feet of development. The fifth level is now approaching the ore chute, and a specimen from the working showed the first free gold yet found in the ground. Production has held at about fifty tons per week while the development was in progress, but now the outlook is good for a heavier yield.

The Bonanza King, drifting from a point 400 feet deep, where the vein was entered from the Midget crosscut, is in a fine body of sylvanite ore, but the management is adverse to giving out the details.

At Telluride the Nellie property, consisting of a group, has been sold by L. L. Davis to Denver people. The consideration was $75,000 cash. This group consists of two patented claims and a patch of thirty-five acres of placer ground. A large force of men will be put to work without delay and the mine made an extensive property at once.

In Gilpin county George W. Middleton has taken a lease and bond on the Columbus lode in Russell district, and a new plant of machinery is on the way.

President W. Brant of the Chase Consolidated Mining Company has been making arrangements for the starting up of their property, in Willis gulch.

From Aug. 14th to Sept. 1st there were shipped from the Black Hawk depot 212 cars of mineral, aggregating 3392 tons, to the Denver smelters and elsewhere, which represented the mineral output for the month of August; and though owing to the scarcity of coal, many of the properties did not produce their regular output, this shows an increase of six cars over the whole of the corresponding month of last year.

At Creede, Senator Abbott has struck a six-foot vein in the Holy Moses tunnel after driving within 25 feet of the distance of 1100, which the survey at the outset indicated would have to be driven.

In the Holy Cross district the Eastern capitalists, since commencement, have expended in development $70,000, the result of which is an 1100-foot tunnel on French mountain, on which the company owns 1000 acres of land. It is intended to drive the tunnel 3500 feet straight into the mountain, cutting the various veins which traverse it. In driving the 1100 feet 250,000 tons of ore have been blocked out, of an average value of $35 per ton. Various tests of the ore were made, and it was definitely ascertained that the best method of treatment was by the cyanide process. The company are now making arrangements to erect a 100-ton cyanide mill.

At Ward, Martin Bassen and G. Moutan have about completed a deal with S. B. Shaw of New York for the sale of the Bald Eagle mine.

A party of St. Louis men were in camp last week looking over the Humboldt and Humboldt Extension mines, with a view of purchasing.

Charles Davis is working about 85 men on his Victoria mine at Summerville, in drifting and stoping. This mine is a silver proposition and the ore now being taken out will run about 300 ounces in silver to the ton.

Watson & Sailor, who have a bond and lease on the Blue Bird, have completed their new shaft house and are sinking the shaft on the mine. A shipment of ore last week gave satisfactory results.

The Giles mill has closed down to allow extensive improvements to the plant. A new 60-horse power boiler is to be added to the equipment and a Corliss engine is to take the place of the two small engines now in use.

ARIZONA.

Journal-Miner: The Crowned King Mining Company has reduced its working force in the mine during the time it will take to sink the shaft and establish a station at the 400-foot level.

The Red Dog and Golden Star groups of mines in the Winifred district, north of Phœnix, are to be sold to Chicago people.

D. M. Riordan has bonded the mine on Cherry creek, Yavapai county, known as the Jesse R, belonging to F. A. Biffer and operated by Butler & Murphy.

Mining News: D. Sheedy and F. F. Struby, Denver capitalists, have bonded the property of Hull & Wingham, in Jerome, for $125,000, $50,000 to be paid on the 19th day of September, 1897, and $25,000 in three six months' payments. The group contains five claims—the Silent, Buncom, 99, Sunny South and Number One.

Assays from a 4-foot vein of copper ore lately uncovered in the St. Peter-Martin properties gave very satisfactory results.

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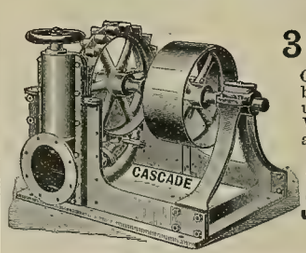

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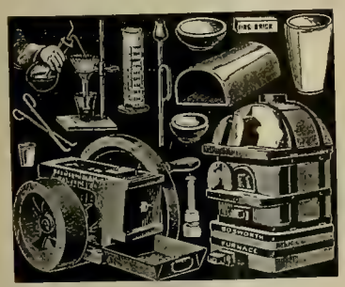

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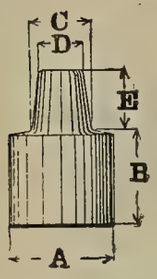

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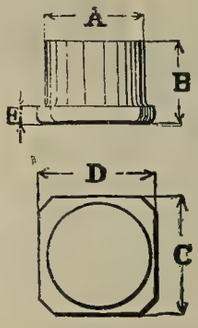

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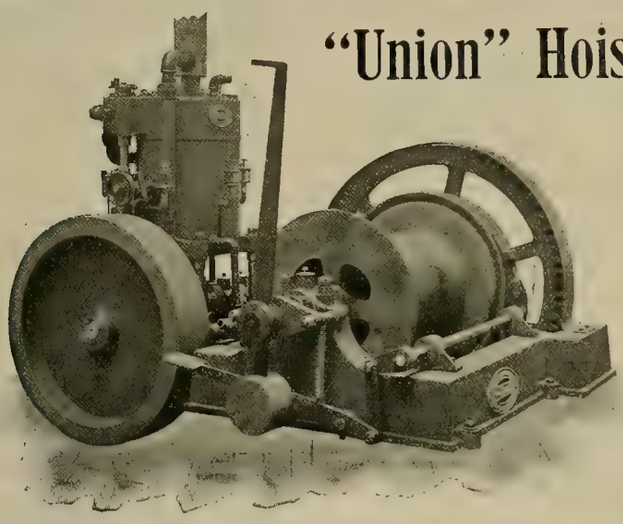

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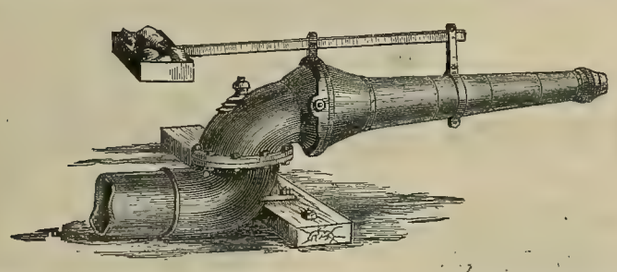

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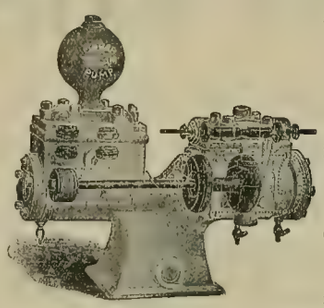

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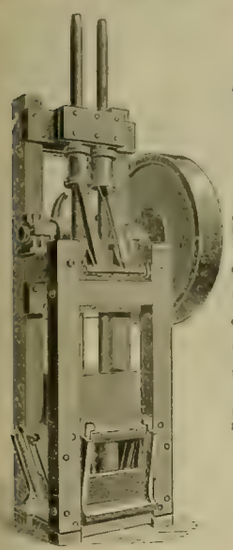

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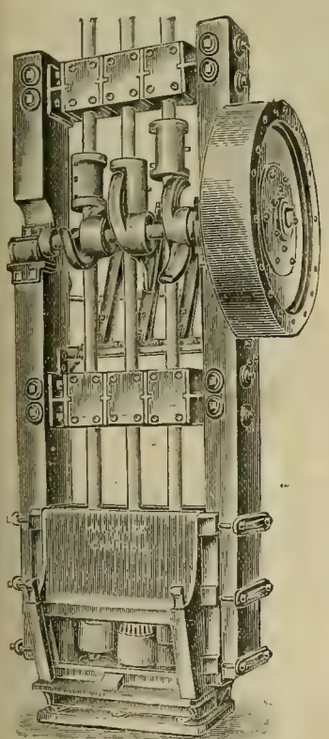

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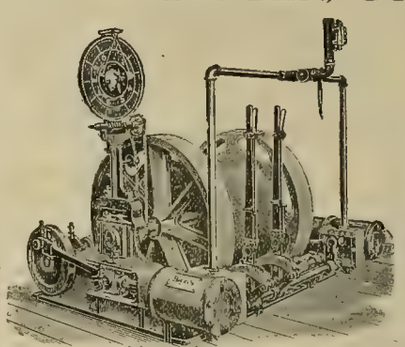

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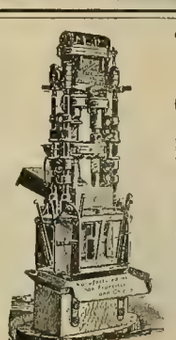

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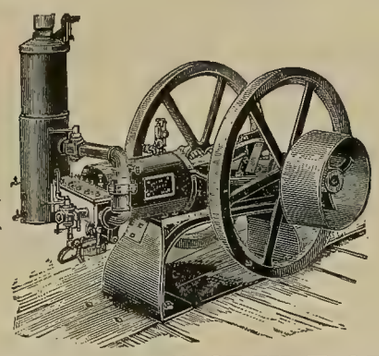

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Crude Petroleum (36 deg.), paraffine base. 13 gallons @ 5c.	65

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon=21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

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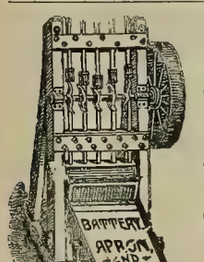

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THE J. H. MONTGOMERY MACHINERY CO., 1220-22 Curtis Street, Denver, Colo., U. S. A.

Just Listen—Reliable Common Sense Steel Whim, price reduced to $100. Steam Hoisters, $300 and up; hand hoisters $30; steel ore buckets all prices; prospectors' stamp mills $300. A 10-stamp mill, new, 850 lb. stamps, high mortars, latest improved. Only $800.

Ores tested and amalgamation and concentration mills built to **fit the ore** and guaranteed to save what we say. Coal Mine equipments, Screens, Jigs, Tramways, Arastors, Chilian Mills, Ore Sacks, etc. Cornish Rolls, 12x20, weight 6,000 lbs., price $350; Feeders. Bumping Tables; Blake Crushers, 7x10, weight 8,100 lbs, only $250. Our 100 page illustrated catalogue **FREE.**

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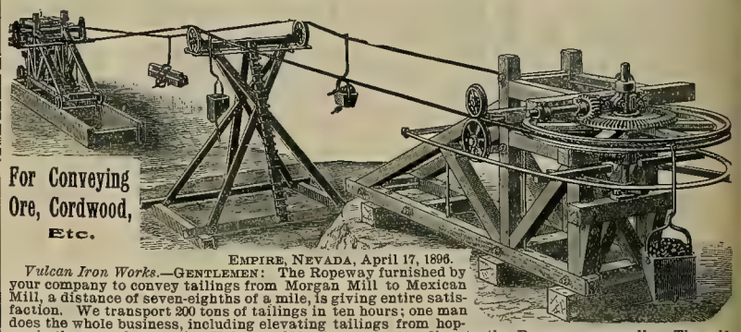
VULCAN ROPEWAY

—WITH—

AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.



For Conveying Ore, Cordwood, Etc.

EMPIRE, NEVADA, April 17, 1896.

Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours; one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self-dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.

Yours very truly, J. P. WOODBURY, Supt.

VULCAN IRON WORKS,

MANUFACTURERS OF MINING MACHINERY,
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THAT OUR ANNUAL PRODUCT OF . . . . . .

INSULATED WIRE

EXCEEDS that of any other manufacturer in the United States, and Includes Everything in the Electrical Line. . . . . .

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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Special attention given to the purchase of Mine and Mill Supplies.

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MANHATTAN RUBBER BELTING, PACKING AND HOSE.
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.

WHY THE SPRINGER CONCENTRATOR IS THE BEST.

It will do more and cleaner work than any Rubber belt machine.
It weighs only one-half as much as some of the other six-foot Concentrators.
Is the most simple in its construction of any machine in the market, and only one-third as many pieces in it as in some of the others. Was invented by an old miner of forty years' experience handling every known concentrator on the market.
Should any piece need repairing, it can be removed without disturbing any other part of the machine.
Can be set up by any inexperienced miner.
Its distributor is perfection itself, distributing the pulp evenly over the entire surface of the belt.
Grade of shaking frame can be changed while the machine is running at full speed.
It is the strongest, lightest running and most inexpensive to keep in repair of any.
Will save more of the fine slimes than any other machine.
Is cheaper than any other six-foot machine, costing only $350.00 f. o. b. cars or boat, San Francisco.
Will handle the pulp from five stamps better than any other Concentrator.
Has adjustable eccentrics, and any length of stroke can be had, thereby giving different speeds per minute.
The belt is very durable, being made of No. 3 Canvas, woven especially for the Springer Concentrator.
This machine requires so little attention that one man will easily attend to a dozen of them.
It has a solid rubber flange, which no other canvas belt has.
Wear and tear upon this machine is not one-third as much as upon some of the other Concentrators.

SAN FRANCISCO, May 27, 1896.

I. S. Van Winkle & Co., 413 Market St.

DEAR SIRS:—In a letter just received from our Superintendent, Mr. Trowbridge, he says, referring to your Concentrator: "The new Springer Concentrator is fulfilling every expectation. A few minor points may be improved upon, but in its main features it is almost perfect. I shall write more fully after further work." Yours very truly, W. H. PAYSON,
Secretary Bald Eagle Mining Co.

Extract from Letter of W. S. Trowbridge, Superintendent Bald Eagle Mining Co. June 20, 1896.

"We work twenty tons of ore per day and size out all coarse portion after it has been worked over two other machines, and run all the slimes and finer portions over your machine. I think it would easily handle twice the quantity. It is certainly doing splendid work now, in a difficult place. I believe the belt will wear indefinitely."

July 12, 1896.

Ship us by steamer another six-foot Canvas Belt Springer Ore Concentrator and have the new Rubber Flange attachment, and put a rawhide belt on wheel. Yours truly, W. H. PAYSON,
Secretary Bald Eagle Mining Co.

THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THIS CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of best Steel and Wrought Iron. Strong and durable. **Price $575 f. o. b.** Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS: First—The Improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 12 to 15 tons of ore per day. Second—The machine equalizes the load by several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allowed to it—in this way preventing the pulp from running to the lower side of it, as is the case when a machine becomes out of level where wide belts are used. Third—The belts run on a perfect line, needing no adjustment to prevent their running from side to side, as in other concentrators. Fourth—The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth—The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth—The feed arrangement is perfect. Seventh—The machine is constructed of iron, with steel crank-shaft self-oiling boxes, and everything made in the most thorough manner, enabling it to run with very little attention or wear.

Geo. E. Woodbury,
Manufacturer,
141 to 143
First St.
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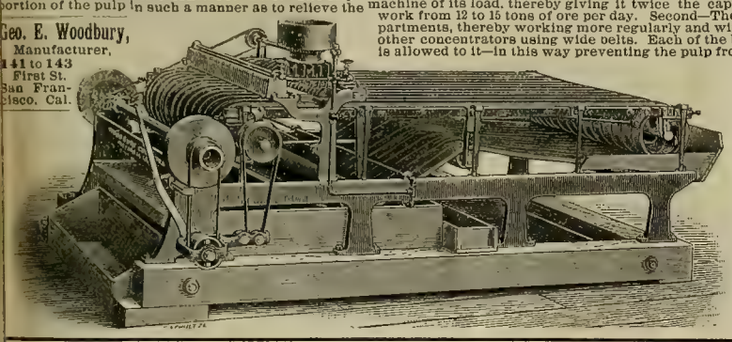

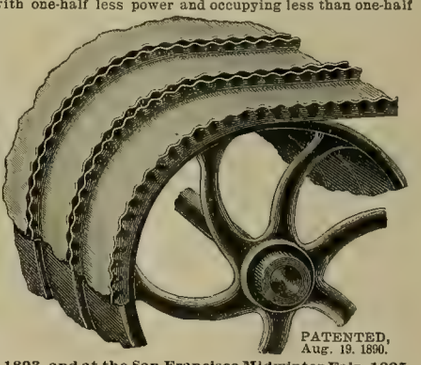

PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st. prize at the World's Columbian Exposition 1893, and at the San Francisco Midwinter Fair, 1895

THE GUTTA PERCHA AND RUBBER M'F'G CO.

30 and 32 FREMONT ST., SAN FRANCISCO.

Spadone's Concentrator Belts. Patented.

The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

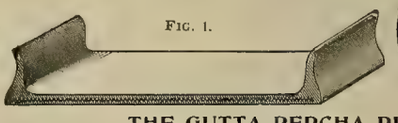

FIG. 1.

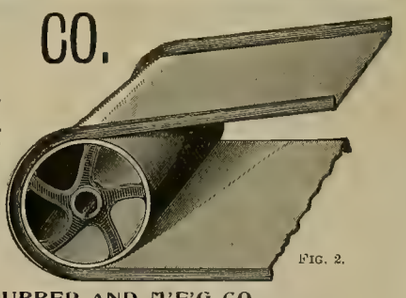

FIG. 2.

We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.

THE GUTTA PERCHA RUBBER AND M'F'G CO.
TELEPHONE, MAIN 1813.

THOUSANDS Now in Use Over the World.

TRUAX Patent Improved
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THEY ARE THE BEST AND CHEAPEST.

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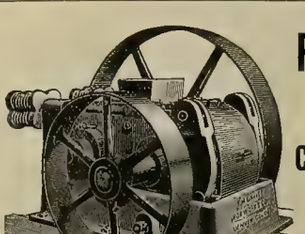
Pat. Jan. 5, '92, Aug. 27, '95. *Send for Catalogue.* Sacramento, California.

DEWEY & CO., Patent Solicitors, 220 Market St., San Francisco.



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Concentration, Chlorination, Cyanide and Amalgamation Machinery.

Complete Plants for Ore Treatment

High Class Machinery and Experienced Modern Engineering.

WRITE FOR OUR PUBLICATIONS.

OFFICE AND WORKS:
723 to 743 Larimer Street, DENVER, COLO.

Market Reports.

The Markets.

SAN FRANCISCO, Oct. 1, 1896.

Merchandise brokers continue to report an improving demand. Although this had been looked for, yet the volume of goods going out is in excess of estimates made thirty days ago. So far as we are able to learn the improvement extends to the agricultural sections as well as to the mining districts. The advance in the market value of wheat and a general lower range in inland freights are the inspiring factors which have brought about the better feeling. There is a growing belief that foundrymen, machinery manufacturers and ironworkers in general will soon begin to feel the invigorating effects of better times among the productive classes. If the advance in wheat is on legitimate and not on speculative lines, it is stated there will be quite a demand next year for farm machinery, which ought to cause the placing of considerable orders. It is reported that in view of better prospective times two or three of the large iron works have secured considerable iron for future delivery, fearing that prices might be advanced later on.

Confirmed advices that the Panama Railroad Company will expend a large sum of money—reported at about $1,000,000—for harbor and other improvements at the Isthmus, is accepted as a forerunner of an improved call for goods and material from that source. This ought to increase our trade in that direction.

In the local money market there is a continued growing ease, with no difficulty met in securing accommodations by those offering good to gilt-edge security. The bankers are disposed to give regular customers better accommodations, if desired by them. As a rule the demand for money is slow, owing to good collections and the commercial interests not having stocked up as large as has been their custom at this season of the year. Money continues to set this way from Australia, owing to exchange being favorable. There are more wheat bills offering, which shows that farmers have been selling on the advancing market. The output of the gold mines is largely in excess of last year's, which adds still more to the available supply of funds. At the East our New York advices are to the effect that the large trust companies are in the market as lenders at 6 per cent on three and six months' time. The banks there are giving better accommodations. The demand for funds at the East is said to be good for crop-moving purposes. There is still large offerings of commercial bills to meet heavier shipments of wheat, iron, rails, cotton goods, etc. These offerings indicate a continued flow of gold to this country, although advancing ocean freight rates may interfere with the free movement of products out of the country.

In Europe the money markets are working closer, with the rates of discount increasing, owing to the continued demand for gold. The premium on the latter is strengthening.

New York Silver Prices.

NEW YORK, Oct. 1.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	30 5-16	65⅝
Saturday	30 5-16	65⅝
Monday	30 5-16	65⅝
Tuesday	30 5-16	65⅝
Wednesday	30 5-16	65⅝
Thursday	30 5-16	65¾

	Copper.	Lead.	Iron.	Tin.
Friday	10 65	2 77½	10 25@12 50	12 90
Saturday	10 65	2 80	10 25@12 50	12 90
Monday	10 65	2 80	10 25@12 50	12 90
Tuesday	10 65	2 80	10 25@12 50	12 90
Wednesday	10 65	2 80	10 25@12 50	12 90

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	05
New York Telegraphic Transfer	10
London Bankers' 60 days	$4.83
London Merchants	$4.82
London Sight Bankers	$4.85
Refined Silver, peroz., 1000 fine	65¾
Mexican Dollars	51½@52½

SILVER.—The market has ruled dull but steady throughout the week. The steamer Doric for the Orient took out $174,900 in bullion. There is a slight improvement in the inquiry from this direction. The East reports a continued fair export movement, with considerable buying on speculation, but prices have not advanced. There is a growing belief, in usually well-informed circles, that there will soon be a better demand for silver; and as supplies are said to be well in hand, higher prices are apt to rule. So far as the writer can see, there is nothing as yet to warrant this belief unless those who predict it base their opinions on a demand from speculators and those who sold short to delivery all the way from thirty days to the close of the year. It is stated that considerable has been sold at 70 cents, and under seller 1896.

MEXICAN DOLLARS.—The market is quiet. The Doric took out for China 47,723 dollars. At the East a fair export movement is reported by our exchanges.

The market is quoted as follows:

Ingot, jobbing	—@13½
Ingot, wholesale	—@12½
Sheet copper	—@16½

LEAD.—The market holds steady on this coast, at the East and in Europe. At the East there has been more buying corroders owing to large increase in the call for mixed paints.

Our market is quoted as follows:

Pig	— @ 3 65
Bar	— @ 4 00
Sheet	— @ 5 25
Pipe	— @ 4 50

COPPER.—The market is quiet. The East reports a fair demand for home and a good export inquiry, with the latter usually at from ⅛ to ¼ cent below current quotations. Europe continues to report a large consumption, which is steadily decreasing stocks held abroad. While the European production of copper has increased only 523 tons for the first eight months of this year, our domestic production shows a gain of over 26,000 tons. Our exports of the metal have increased 33,579 tons, or over 7000 tons more than the increased production. The United States is today the world's base for copper supplies. Principal copper supplies of the world in long tons from 1879 to 1895:

	1895.	1894.	1890.	1882.	1879.
World	334.105	324.505	269.455	181.622	151.963

Principal source of supplies are:

U. S.	172.300	159.695	116.325	40.470	23.850
Spain	54.950	53.995	51.700	39.560	33.361
Chili	22.975	21.340	26.120	42.909	49.318
Average price:					
Chili bars.	£42 17s 6d	£40 2s 6d	£54 1s	£67 6s	£57 11s

ANTIMONY.—The demand is fair, with the market steady at 7⅞@8½c in a jobbing way. New York mail advices quote 7⅜ for Cookson's, 6⅝c for Hallett's and 6½c for Japanese, from store.

BORAX.—The movement Eastward continues quite free.

The market is quoted as follows:

Refined, in car lots	6½
Refined, in sacks	5⅞
Powdered, in car lots	5½
Concentrated, "	5⅝

QUICKSILVER.—The market is steady at quotations.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

SHOT.—The retail call is steadily enlarging.

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

TIN.—The season's demand is over, which causes a dull market with quotations largely nominal.

Pig, per lb	13½
Plate, I C coke, heavy, per box	—@$4 05
" " light, "	—@ 3 95

POWDER.—The demand is exceptionally large at unchanged quotations.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
" No. 2, " "	8½c

IRON.—Our market is practically unchanged. The East reports an improving demand, but no advance in prices. Higher ocean freights are against free exporting. So far this year there have been shipped out of the country 50,000 tons of steel rails. Japan has been increasing her purchases in this country at the expense of Europe.

Our market is quoted as follows:

AMERICAN.	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00
ENGLISH.		
Barrow	$21 00	$23 50
Gartsherrie	21 50	23 50

Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing	20

COAL.—While quotations are given out unchanged, it is stated that sales of near-by, prompt shipment and future shipments have been made for less money. The advance in wheat charters is attracting more vessels with coal to this port. Domestic coals are easier. The consumption is steadily enlarging.

SPOT FROM YARD—PER TON.	
Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 00@ 5 50
Coos Bay	—@ 4 50
Cannel	—@ 8 50
Egg, hard	—@11 50
Wallsend	—@ 7 00
Scotch Splint	—@ 7 50
Brymbo	—@ 7 50
TO ARRIVE—CARGO LOTS.	
Australian	5 50
Liverpool Steam	6 25
Scotch Splint	—
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	—		— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—The demand is dull for home and fair for export.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is barely steady.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, Oct. 1, 1896.

The market has been dull and heavy the past week, with a gradual easing in prices up to Wednesday when a stronger tone set in along the whole line. On Tuesday Con. Virginia sold at $1.55, Chollar at $1.95 and Potosi at 68 cents. The rest of the market shaded off slightly in sympathy. The selling of Potosi down to 68 cents was due to the levying of a 25-cent assessment. The market continues to act as if it was a freeze-out game preliminary to an upmove. The money market is setting in favor of more ease, but this may not be pronounced until after the annual meetings of some of the leading banks. The scare of a money stringency is wearing off under accumulating funds in the banks and at the Sub-Treasury in this city and a big advance in prices for wheat. Notwithstanding this, there does not seem to be any speculative movements. Outsiders who gave considerable attention to mining shares have been attracted to wheat, owing to futures in this cereal having rapid fluctuations. Official letters from the mines do not give much encouragement to those who are drawn into operating in shares when there are lively fluctuations. While the letters are not of an encouraging character in this direction, still they report work under way in several mines which may lead up to ore strikes. The general scarcity of shares available for shorting by outsiders is in favor of manipulators who can do the selling at every favorable opportunity, but these have been few and far between. The low prices ruling for shares are also against outsiders selling short. Interest is still centered on the work on the Brunswick lode. While many look for a decided improvement in the 400-foot level of the Hale & Norcross-Chollar south drift over the 300-foot south drift, yet there are those who hold to the opinion that nothing big will be found. As yet, the work is not pushed with vigor. Why this is so, is one of the problems hard to solve. It may be the manipulators have not secured enough shares and are making slow progress in the hopes of tiring holders out. In the Bodies trading has been quiet also, with very little change in prices. While the market at this writing is against buyers, yet the general tone warrants the belief that a small move is near at hand; but before it comes prices may shade off a little more, to frighten holders into selling.

The news from the Comstock mines, as officially reported, is far from encouraging, but private advices, from seemingly reliable sources, are quite hopeful that better news will come to hand before long, probably after the freeze-out game is well through with. From the north-end group of mines the same old sing-song, stale advices come to hand through official sources; and as for that, the letters from the other groups do not show much, if any, variation. It would seem that a saving of money could be had by having a number of letters struck off and changing the dates and distances run from week to week. In Utah, Sierra Nevada, Union and Andes the work has not been changed in any essential feature. The managements do not appear anxious to push the work. This may be done on economical grounds so as not to let assessments come too often. In Mexican the north drift from the west crossdrift on the 1000-foot level was, at last advices, in porphyry, clay and quartz seams. In Ophir, on the 1000-foot level, the advices only mention work in the No. 2 west crossdrift, which was out 32 feet. Exploiting work is still being done on the old central tunnel level. Some low-grade ore is being found. Interest continues to be centered on Con. Virginia, owing to work being carried on on three levels, with considerable unexplored ground to be exploited. On the 1000-foot level it is to the west towards the Ophir and on the 1650-foot level to the east towards Best & Belcher. From the 1750-foot level ore is still being raised, but it is not in sufficient quantity or of high enough grade to cover current expenses. In Best & Belcher and Gould & Curry the east crossdrift from the 800-foot Bonner shaft level is being pushed slowly ahead. At last advices it was in about 160 feet. The Savage letter is unimportant. From Hale & Norcross the advices regarding the work on the 900-foot level is quite encouraging. The ore in the upraise was, at last advices, still improving. More ore is being extracted, having a market value of about $75 a ton. On the 1100-foot level they are running east and also preparing to raise on a streak of ore going $22 a ton market value. In Chollar and Potosi the news is practically the same as reported last week. In Bullion they are still running the north drift started 2170 feet in the west crossdrift. Alpha's official letter reports work continued on the 500-foot level. In Con. Imperial, west crossdrift No. 3 is still being pushed slowly ahead, as is the joint Challenge-Confidence-Con. Imperial west crossdrift. From Challenge and Confidence nothing new is reported. From Yellow Jacket no news is allowed to leak out about the work. In Crown Point, exploiting work is still under way on several levels. The low-grade ore that was milled just about covered expenses for extracting, milling and transportation. The gross yield of ore milled by Belcher gave a return of about $7700. The letters are still silent as to the work that is being done. From Seg. Belcher and Overman nothing new is at hand. The same remarks can be applied to advices received from Alta.

On the Brunswick lode our advices from Occidental are essentially unchanged. In Chollar they are still raising from the 200-foot level for surface connection. On the 300-foot level the south drift is still being pushed slowly ahead. On the Hale & Norcross 400-foot level the south drift has not reached the Chollar north line. Better news is expected before long. In the north drift on this level the ground continues soft and is of an encouraging character. In Savage work is continued on the 300-foot level. The work in Gould & Curry ought to attract more attention before long. In Best & Belcher and Con. Virginia they are still sinking the shaft.

From the Bodie district the news is about the same as heretofore reported. Considerable work is being done in each mine, with some ore raised and milled each week by the Standard, Bodie and Bullion.

The official letter from Silver King, Arizona, states that they are again in position to handle the water.

The following illustrates the changes of the week:

MINES.	Sept. 24.	Oct. 1.
Alpha		$ 13
Alta Consolidated		
Andes		
Belcher	$ 54	54
Best & Belcher	94	88
Bodie	65	60
Bullion	21	18
Challenge	55	53
Chollar		2 15
Confidence	1 40	1 35
Consolidated California and Virginia	1 75	1 70
Consolidated New York		
Crown Point	51	49
Exchequer	04	
Gould & Curry	52	
Hale & Norcross		1 40
Justice		
Mexican	49	49
Ophir	95	88
Overman		13
Potosi	86	73
Savage	60	
Sierra Nevada	70	67
Union	36	55
Utah		
Yellow Jacket	34	30

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24	Sept 24..Oct 24	E D Farish, 632 Market
Bay State M & D Co, Cal	33	3c	Aug 21	Sept 30..Oct 20	F E Luty, 330 Pine
Bullion Mining Co, Nev	42	10c	Aug 14	Sept 15..Oct 8	R R Grayson, 331 Pine
Central Eureka	3	2c	Sept 3	Oct 10..Nov 2	Wm A M Van Bokkelen, 320 Sansome
Channel Bend M Co	4	2c	Sept 14	Oct 16 Nov 7	J P Langborne, 39 Sutter
Crown Point M Co, Nev	68	20c	Aug 18	Sept 23..Oct 13	J Newlands, Mills Building
De Soto G M Co	1	7c	Sept 7	Oct 10..Nov 9	E H Clark, Mills Bldg
Goleta M Co	4	20c	Sept 21	Nov 2..Dec 2	D M Kent, 330 Pine
Quaker G M Co	40	12c	Sept 7	Oct 8..Nov 5	C W Poindexter, 418-420 Market
Gould & Curry S M Co, Nev	79	15c	Sept 1	Oct 5..Oct 27	A K Durbrow, 309 Montgomery
Marguerite G M & M Co	4	20c	Sept 21	Nov 10..Dec 15	Chas Peach, 237 12th
Montecito M Co	3	15c	Sept 21	Nov 2..Dec 2	D M Kent, 330 Pine
Occidental Con M Co, Nev	24	10c	Sept 3	Oct 8..Oct 29	A K Durbrow, 309 Montgomery
Potosi M Co, Nev	46	25c	Sept 28	Nov 4..Nov 24	Chas E Elliott, Nevada Block
Reward G M Co, Cal	1	3c	Aug 8	Sept 14..Oct 5	J Stadtfeld, 309 Montgomery
Sterling M Co	3	15c	Sept 21	Nov 2..Dec 2	D M Kent, 330 Pine
Sumdum Chief M Co	1	15c	Sept 2	Oct 19..Nov 5	H G Stevenson, Hobart Bldg
Troy M & Dev Co	1	12½c	Sept 7	Oct 14..Nov 7	Otto Ryst, 525 Front
Union Con S M Co, Nev	53	20c	Aug 25	Sept 28..Oct 22	A P Swain, 309 Montgomery
Utah Con M Co	23	5c	Sept 10	Oct 13..Nov 2	A W Havens, Nevada Block
Yellow Jacket S M Co	61	25c	Sept 11	Oct 15..Nov 20	W H Blauvelt, Mills Bldg

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Anchor Coal and Development Co	E D Farish, 632 Market	Oct 20
Idlewild G M Co	D C Bates, Nevada Block	Oct 14
Reward G M Co	J S Stadtfeldt, Jr, 309 Montgomery	Oct 7
Con Cal & Va M Co	A W Havens, Nevada Block	Oct 19

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San Francisco Stock Board Sales.

SAN FRANCISCO, October 1, 1896

9:30 A M SESSION

100 Alpha	12	300 Mexican	49
600 Belcher	54	100 Ophir	88
300 Best & Belcher	88	100 Overman	14
800 Bullion	18	100 Potosi	73
700 Bulwer	41	50 Sierra Nevada	66
100 Challenge	33	600 Union	85
50 Confidence	1 35	100 Yellow Jacket	20
100 Crown Point	16		

SECOND SESSION—2:30 P M

500 Ophir	88	200 Belcher	53
50 Best & Belcher	88	50 Confidence	1 35
200 Con Cal & Va	1 70	50 Sierra Nevada	67
200 Challenge	2 15	500 Occidental	25
200 H. & N	1 10	200 Belcher	60
200 Crown Point	19	300 Mono	18

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Tickets and sleeping car reservations at No 1 Montgomery St. Steamship tickets on sale to and from all points in Europe. D W. HITCHCOCK, General Agent, San Francisco.

UNITARIAN LITERATURE sent free on application. Address Postoffice Mission Committee, First Unitarian Church, corner Geary and Franklin streets, San Francisco. Mention this paper.

Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the first day of September, 1896, an assessment (No. 79) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th (5th) day of October, 1896, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold on TUESDAY, the 27th day of October, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office: Room No. 69 Nevada Block, No. 309 Montgomery street San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 2d day of September, 1896, an assessment (No. 24) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 69 Nevada block, No. 309 Montgomery street San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of October, 1896 will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 29th day of October, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW Secretary.

Office: Room No. 69 Nevada block, No 309 Montgomery street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING COMPANY. Location of principal place of business, San Francisco, California; location of works, Auburn, Placer county.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-first (21) day of September, 1896, an assessment (No. 1) of twenty (20) cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 257 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on TUESDAY, December 15, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. PEACH, Secretary.

Office—257 12th street, San Francisco, Cal. Office hours from 4 to 5 o'clock P. M.

THE CALIFORNIA DEBRIS COMMISSION, HAVING received applications to mine by the hydraulic process from Larsen & Harris, in the Larsen mine, near Placerville, El Dorado Co., to deposit tailings in North Canyon; from A. F. Sheehan, in the Blue Eyes Mine, in Duncan Canyon, Placer Co., to deposit tailings in a dry ravine; from the Plymouth Consolidated Gold Mining Co., in the Bell & Dorsey Mine at Indian Diggings, El Dorado Co., to deposit tailings in Indian Diggings Creek and Scott Creek; from E. A. Wilsee, in the Gold Run Mine, at Gold Run, Placer Co., to deposit tailings in Canyon Creek, and from H. Spaulding, to work in the Cregeroft Mine, near Downieville, Sierra Co., to deposit tailings in Hughes' Ravine, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on October 12, 1896, at 1:30 P. M.

GOLD MINING PROPERTIES.

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

DEWEY & CO. PATENTS 220 MARKET ST. S.F. SCIENTIFIC PRESS PATENT AGENCY

DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, near La Porte, Plumas county, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 13th day of July, 1896, an assessment was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 38, Crocker Building, San Francisco, California, and that all stock upon which said assessment remained unpaid on the 17th day of August, 1896, would be delinquent and advertised for sale at public auction, and unless payment was made before would be sold on MONDAY, the 21st day of September, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

Names.	No. Cert	No. Shares.	Amt.
E C Cain	150	200	20 00
E C Cain	151	2,400	240 00
C L Dingee Jr	57	800	80 00
C L Dingee Jr	58	800	80 00
Geo G D Gregorie	18	10,000	200 00
E C Godfrey	109	800	80 00
E C Godfrey, Trustee	101	1,600	160 00
E C Godfrey, Trustee	102	1,800	180 00
E C Godfrey, Trustee	103	1,600	160 00
E C Godfrey, Trustee	141	1,600	160 00
E C Godfrey, Trustee	142	1,600	160 00
W H Gregory	15	400	40 00
H T Hewes	5	100	10 00
E H Hawkins	76	100	10 00
Wm. Jones	75	100	10 00
G B Lindy	83	1,000	100 00
J F K Lacoste	148	1,400	140 00
C A Moore, Trustee	106	2,222	144 44
C A Moore	107	2,222	144 44
Percy P Moore	115	6,000	120 00
Percy P Moore	118	2,222	144 44
Percy P Moore, Trustee	150	100	10 00
Jos A Pratt	1	2,400	240 00
Jos A Pratt	2	2,400	240 00
Jos A Pratt	3	2,400	240 00
Jos A Pratt	54	2,400	240 00
John E Todd	4	2,400	240 00
John E Todd	6	2,400	240 00
John E Todd	9	2,400	240 00
John E Todd	55	2,400	240 00

And in accordance with law and an order from the Board of Directors made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38 Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office: Room 38 Crocker Building, San Francisco, California.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of Sale for the above delinquent stock was postponed until WEDNESDAY, October 21st, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California.

E. C. GODFREY, Secretary.

DELINQUENT SALE NOTICE.

ANCHOR COAL AND DEVELOPMENT COMPANY. Location of principal place of business, San Francisco, California; location of works, Kelso, Cowlitz county, Washington.

Notice. There are delinquent upon the following described stock, on account of assessment (No 7) levied on the Twenty-fourth (24) day of August, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert	No. Shares.	Amt.
Mrs. Edith Grey	222	100	3 00
Mrs. Edith Grey	225	100	3 00
R. M. Woodford	559	100	3 00
Jas. E. Azer Trustee	651	500	15 00
W. H. Gregory	488	500	15 00
W. H. Gregory	489	500	15 00
W. H. Gregory	636	500	15 00
F. M. Meigs	818	350	10 00

And in accordance with Law, and an order from the Board of Directors, made on the 24th day of August 1896 so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the company, Room 5, 632 Market St., San Francisco, California, on SATURDAY, the 24th day of October, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. D. FARISH, Secretary.

Office: No. 632 Market Street, Room 5, San Francisco, California.

ANNUAL MEETING. The Annual Meeting of the stockholders of the Anchor Coal and Development Company will be held at the office of the Company, No. 632 Market St., room 5, San Francisco, California, on TUESDAY, the 20th day of October, 1896, at 1 o'clock P. M., for the purpose of electing a Board of Directors for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, October 17th, at 12 o'clock M.

E. D. FARISH Secretary.

Office: Room 5, No. 632 Market street, San Francisco, California.

ANNUAL MEETING. THE REGULAR ANNUAL meeting of the Stockholders of the Consolidated California & Virginia Mining Company will be held at the office of the company, room No. 29, Nevada block, San Francisco, California, on MONDAY the 19th day of October, 1896, at the hour of 1 P. M., for the purpose of electing a board of directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, October 17, 1896, at 12 noon. A. W. HAVENS, Secretary.

Office: Room No. 29, Nevada block, No 309 Montgomery street San Francisco, California.

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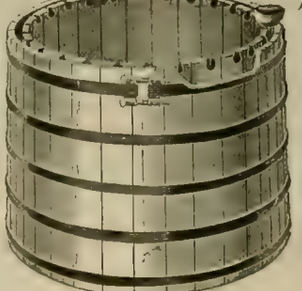

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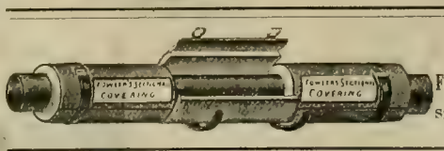

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READ WHAT MINERS THINK OF THE BRYAN IMPROVED ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.
The mills require very little attention. At our mill an ordinary peon," earning one dollar per day, has complete charge.

In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY,
S. BAMBERGER, President and Manager,
SALT LAKE CITY, UTAH, October 10, 1895.

B. B. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO,
C. C. MCIVER, President; D. CUSHMAN, Secretary,
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. MCIVER, President.

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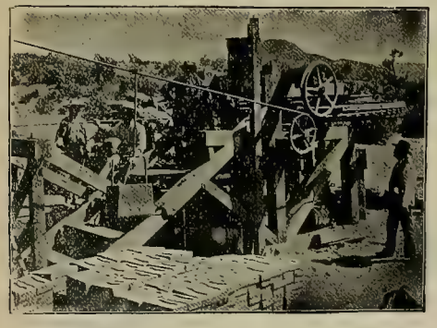

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The Miners' Convention.

Secretary Sonntag of the California Miners' Association has sent out to the county organizations a call for the convention, in which he says:

"You will please take notice that the annual meeting of the California Miners' Association will be held in this city on Tuesday, November 10, 1896, under the constitution and by-laws adopted last year by the convention. It is necessary for the secretary of each county organization to forward to me two weeks previous to the holding of the convention, a list of delegates appointed. I would ask that this rule be observed so as to facilitate the work of this office, and shall expect the lists forwarded not later than the 27th of the present month.

"Arrangements will be made with the railroads for reduced rates of fare.

"There are many matters that will come before the convention that will be of the utmost importance to miners of the State, and it is hoped that each county organization will send a full and complete delegation."

In neither Amador nor Sierra counties are there local miners' associations, and the members of the executive committee of the State Association from those two counties have been asked to endeavor to form county associations. The convention badge this year will be of silver, representing Marshall.

There is talk among members of refusing to listen to the declination of the veteran, President Jacob H. Neff, to again become a candidate. Certainly the coming year promises to be very important in the history of the California Miners' Association, and much will depend upon the choice of an executive officer.

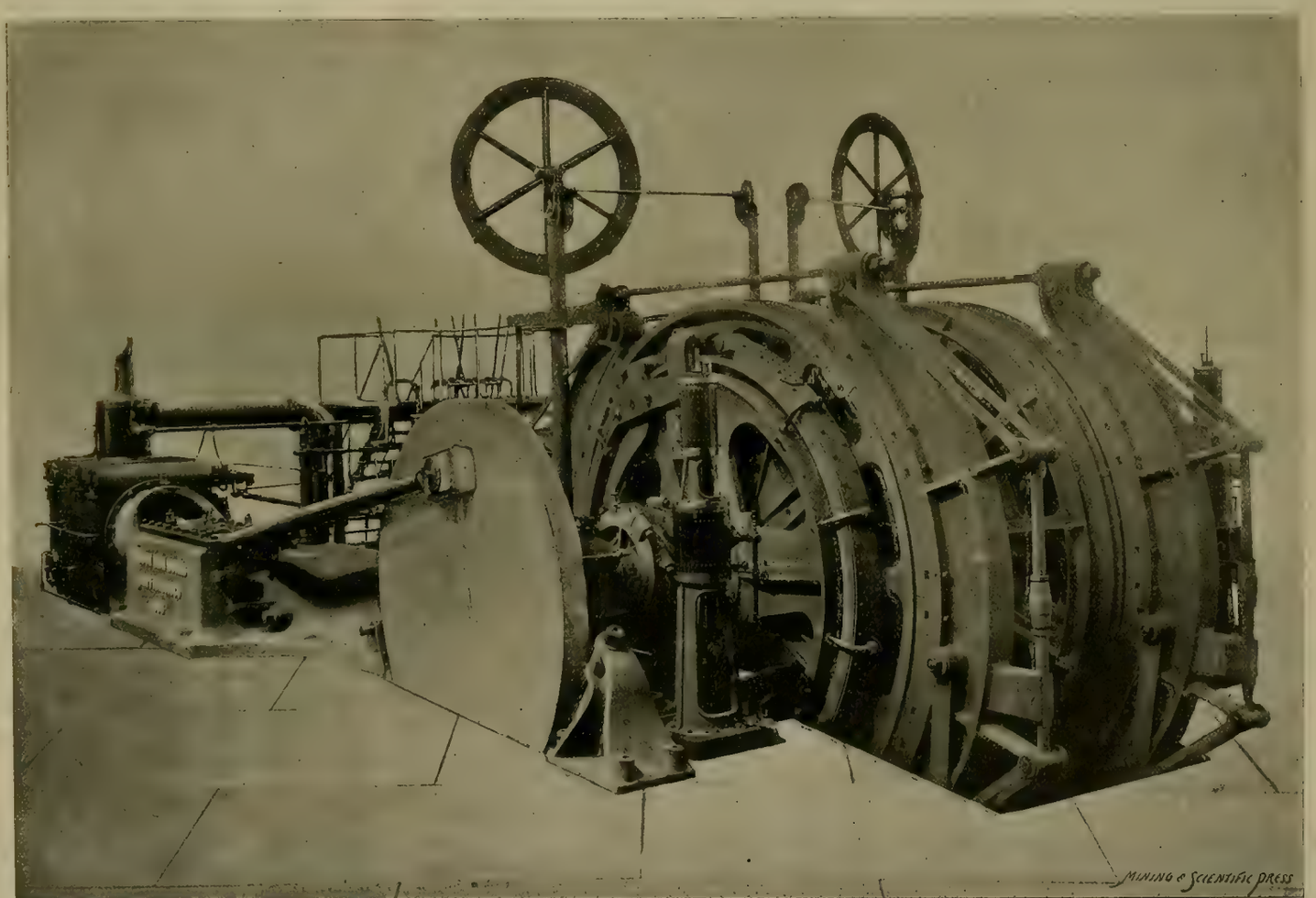
Many of the members seem to have gained an idea that as soon as the questions connected with the Land Department at Washington and the railroad land grants are settled there will not be much work for the association to do. But with the rapid growth of the industry there will be more need than ever for the good offices of such a representative body of men. There is needed legislation to be asked of the State Legislature and of Congress. As the industry grows its needs in these directions increase. Less attention is paid by the State to the industry in proportion to its importance than any others.

The Association can, if it will, do much toward securing proper support and intelligent direction to the State Mining Bureau and the School of Mines at the State University.

But the most important thing that can be done, and what would be of the most lasting benefit, would be to secure the establishment of a department of mines in the Federal Government. The Northwest Mining Association during the past week has taken up this question at its first annual convention. No doubt other mining bodies will do likewise, and there is every promise of concerted effort on the part of all the miners of the country.

Hoisting Engine for Anaconda.

A large amount of heavy mining machinery continues to go out of California. This is due mainly to the good progressive work being done by the manufactures. On this page we illustrate a new hoisting engine recently placed in the Anaconda copper mine in Montana, which are being purchased by the Exploration Company of London for over thirty million dollars. This is one the largest engines of the kind in the country, the cylinders being 30x72, suitable for 125 pounds working pressure. As will be seen by the cut, flat rope is used, and all the operating parts are controlled by separate engines. The engine was built and finished by the Risdon Iron and Locomotive Works of this city, within four months from the date of the receipt of contract. It was delivered in Butte last week and placed in position.



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J. F. HALLORAN.....General Manager

San Francisco, October 10, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Hoisting Engine Built in This City for the Anaconda Mine, 293. Galvanometer; Dynamo Used in Electrical Instruction, 299.

EDITORIAL.—The Miners' Convention; Hoisting Engine for Anaconda, 293. Moneys Collected From Mining Incorporations for the Mining Bureau; Increase of Voters in the Mining Counties; Money Expended on So-called Development Work; California Experts Abroad; A Mining Bureau Bulletin; Mining Progress, 294

ELECTRICAL PROGRESS.—Electric Mining; Electricity and Rifle Practice; Electric Farming, 299.

SCIENTIFIC PROGRESS.—Electricity Taught by Correspondence; Aluminum Bronze and Its Uses in the Arts; How Violet Rays of Sunlight Act upon Moist, Organic Matter; Treatment of Ramie, 299.

MECHANICAL PROGRESS.—Accumulation of Waste Glass; A Competitor in Pig Iron; Horseless Carriages; Feathers in a Bicycle Tire, 300.

PRACTICAL INFORMATION.—Western Real Estate and Building; Population of the Globe; New Metals for Coins; Electric Road Between Chicago, St. Paul and Minneapolis, 300.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 302–3.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 310.

MISCELLANEOUS.—Concentrates, 295. Gold Mining in California; Gold in the Guyanas, 296. Gold in Granite and Plutonic Rocks, A Cheap Cyanide Plant, 297. How to Frame a Report, 298. Coast Industrial Notes; Recent Patents; Books Received; Recently Declared Mining Dividends; Recent California Mining Incorporations; Personal, 301.

IN THE valuable article on the "Gates' Canvas Plant," by W. S. Hutchinson, published in our last issue, the scales of the sketches were given incorrectly. They should be: for Fig. 1, scale ¼-inch to 1 foot; Fig. 2, scale $\frac{3}{32}$-inch to 1 foot; Fig. 3, scale ½-inch to 1 foot.

IN the act establishing the State Mining Bureau, it is provided that it shall be the duty of the tax collectors in the several counties in the State and of the license collector of San Francisco to transmit to the State treasurer, for the Mining Bureau fund, all moneys collected by them from mining corporations or from corporations formed for milling ores or for supplying water for mining purposes, under the act imposing a tax of 10 cents on the issuance of each certificate of stock of corporations. Except as to San Francisco, this law has never been enforced. Estimates have been made which show that if it were enforced, enough money would be collected to maintain the Bureau. It is understood that the Governor proposes to take steps to have the law enforced.

THE number of voters registered in Nevada county this year is 20 per cent more than that of 1894. There has been even a larger increase in Shasta county. In all the mining counties, in fact, the increase in registration over that of 1894 is far out of proportion to any previous increase in any part of California for the last thirty years. There has been no large immigration into California to cause this filling up of the mining districts and it is not probable that it indicates a large increase in the total population of the State. The mining districts have drawn principally from other parts of the State and have given employment at wages higher than those paid in any other parts of California. The large increase of population in these counties has not caused any complaint of hard times nor of the presence of large numbers of unemployed.

A LARGE PROPORTION of the money being expended in California upon so-called development work is wasted. This is especially true of smaller mines, where the owners sink many shallow shafts or run short tunnels, that do not any more than prove the presence of good prospects. They do little to show up the extent and value of ore bodies. This is one of the relics of the vicious system of earlier quartz mining in this State, when it was supposed that mines along the mother lode would not pay in depth. Taking the mines in this State that have been big producers, nine times out of ten we will find that they are mines that have been abandoned after a lot of money has been wasted in "gophering" on the surface. Capitalists later took hold of these same prospects, and, by working them properly, developed good mines. The cost of sinking several shallow shafts or running short tunnels often amounts to more than enough to sink one deep shaft that will develop large ore bodies; and not only that, but be of permanent use in working the mine. Yet it sometimes happens that the mine owner is wise in not sinking very deep. He knows the old maxim that many a rich prospect has been ruined by developing it.

California Experts Abroad.

The London *Mining Journal*, in an editorial entitled "English and Foreign Mining Experts," speaks of the rapid replacement in late years of English mining engineers by foreigners, and especially Californians. A few years ago the financier in London who had taken up the exploitation of a mineral property would apply to an English firm of experts, and would secure the services of an accredited English engineer to report upon its prospects and value. When a company was formed to carry on the working of the mine the technical staff would be drawn mainly from Cornwall, and technical supervision and advice would be sought from the firm in London originally consulted. Now the *Mining Journal* says:

Since the development of the South African gold fields, however, it must be admitted that the glory of the English mining expert has, to a considerable degree, departed. It is a confession which we make with considerable reluctance, but which, at the same time, in the interests of the mining profession, it seems desirable to make. The financial creators of the Rand were mainly men of experience on the Kimberley diamond fields, and there American mining methods and men had already been appealed to with some success. They complained that Englishmen did not adapt themselves to the strange conditions of working on the Witwatersrand. The college-taught expert was declared to be a compound of British pedantry and German scholasticism, with little or no practical experience and an unintelligent reliance upon inapplicable text-books. The Cornish "captain" was scarcely an improvement. He understood mining practically enough, but it was only as it is understood in Cornwall. * * * * *

It is true that there were numerous exceptions to these strictures. Some of the most successful mines on the Rand have been developed by consulting engineers who came straight from the English technical institutions, or by managers who had learned everything they knew in Cornish tin mines. At the same time it is impossible to shut one's eyes to the fact that there has been, as a whole, a tendency in South Africa to supplant Englishmen as engineers and managers by Americans and Germans. At the present time the most brilliant advisory positions in both the Transvaal and Rhodesia are held by men whose training ground has been California, and managerships are increasingly coming into the hands of their countrymen. A young Englishman with the highest testimonials who goes out to Johannesburg will find considerable difficulty in obtaining a responsible position at a mine of which the directorate is almost entirely English, and the capital of which has been entirely obtained from England. In Western Australia, the same tendency is exhibiting itself with even greater force.

That this is a regretable state of affairs even the most dividend-absorbed mining shareholders will admit. To give the the technical administration of our mines to Americans and Germans is to render it almost certain that the majority of the orders for machinery and other supplies will go to the United States and Germany. As a matter of fact, this result has already largely happened from the growth of the foreign element in mining centers exploited by British capital. There is no need to assign reasons of personal interest to account for such a displacement of trade. A man who has learned mining in California is almost certain to go for the appliances of mining to the sources from which California obtains them. So far as shareholders are directly concerned, the evil of this foreign pre-eminence lies in the inferior *morale* of foreign to English experts. Speaking broadly, we may say that the mining engineer who has been educated in this country looks upon himself as the servant of the shareholders; an American or German is frequently avowedly the employee of a certain group of financiers. In principle, at all events, we cannot say that we admire the system of appointing a man the salaried servant of a private firm or a limited company whose business it is to dispose at a profit of the properties upon which he reports. It is a nice point whether the Californian or German engineers really possess the superior qualifications in regard to technical knowledge with which the mining community in South Africa and Western Australia appears to be ready to credit them. As a rule, the foreigner is more pretentious, and his abilities and knowledge are often less solid than those of an English rival who impresses a financier much less strongly. Many a smart Yankee has of late, since the outburst of favoritism for American engineers, acquired a share in the management of an important mine worked by English capital merely on the strength of a short residence in a Californian mining camp. Moreover, the supply of genuine Californian mining experts is somewhat limited, and many of the Yankees who have recently been imported into the Rand and Coolgardie are the immediate emanations of an Eastern university. They possess even smaller practical knowledge than the discredited Englishman.

It is, however, probable—and we think most experienced English mining engineers will agree with the opinion—that the teaching in English technical institutions is a good deal more inelastic and unpractical than in the corresponding places of the United States and the Continent.

It is true that the education of the English technical schools is less elastic than ours, but that does not give the Californian so much advantage. The success of the Californians has been due more to elasticity of their ability than their education. A Californian can adapt himself to new circumstances and take up new and comparatively unfamiliar work far better than his more conservative brother from England. The Californian appreciates the fact that the main value in an education is not that by it he learns how to do things, but to find out anything he may want to know. He is self-reliant, but at the same time will not hesitate to gather information from others. He relies more on his natural talent and ingenuity than upon hard and fast rules he has learned in schools or under circumstances different from those in which he finds himself.

A Mining Bureau Bulletin.

The State Mining Bureau has just issued an important bulletin entitled "A Bibliography Relating to the Geology, Paleontology and Mineral Resources of California," compiled by Captain Anthony W. Vodges, U. S. A. The literature relating to the mineral resources of California is widely scattered and to a great extent inaccessible to any but the specialists. Much of this literature would be made use of by those interested if they had any idea of its existence. A great many books and articles in various publications have been issued concerning California that are unknown except to a few. There are many articles incorporated in official publications of the United States and of the State of California, in magazines and in publications of the State University whose very existence is almost unknown to the general reader. Mining men are continually inquiring for publications on special subjects. This bulletin will, to a certain extent, supply that want.

It is remarkable the amount that has been written about California. Captain Vogdes' bulletin is a pamphlet of over a hundred pages, and to each book, pamphlet or article published there is devoted but a few lines.

We would suggest to the Mining Bureau that it continue the good work thus inaugurated by publishing a bulletin giving the bibliography of metallurgy, mining and other works wherever published that would be of value to the miners. The PRESS is so constantly in receipt of requests for the names of the best books on special subjects connected with mining, that we believe that such a publication would be heartily welcomed.

Mining Progress.

In no other industry are modern inventions more quickly taken up and pushed to the front than in mining. Much has been said in the PRESS of the good that has been done by the mining industry in settling up of the West. Much might also be said of what mining has done for science in a practical way through what was learned in the hydraulic mining operations of this State.

The old laws as to the flow of water and canals have been entirely discarded and the literature on that subject entirely rewritten. The construction of pumping machinery has been brought to the highest point, and far more through mining than anything else. Mining has done more in a practical way for the introduction of electricity for generating and transmitting power. As a matter of fact, it has given an impetus to all kinds of inventions, and a greater impetus than any other industry can give, because the rewards are larger. In a broader way, it has stirred up research in chemistry, metallurgy and geology.

Concentrates.

A NUMBER of miners from Grass Valley have gone up to the mines of southern Oregon.

IT is reported that Charles D. Lane has purchased the La Grand Oro property near Carson, Nevada.

THE Mountain Chief mine in Willow valley, Nevada county, has been bonded and will soon be reopened.

A MEETING was lately held in New York to take steps toward the formation of a new mining exchange.

THE Union Hill Mining Company have decided to erect a 200-stamp mill on their property in the Black Hills.

THE Morning Star Mining Company of Iowa Hill has declared its seventieth dividend, amounting to $4 per share.

PROSPECTORS last Wednesday filed notices of location of cinnabar mining claims on the Presidio reservation in this city.

A QUARTZ VEIN that promises well has been discovered in the bedrock of the Sailor gravel mine in Sailor canyon, Placer county.

SOME discoveries made of quartz near the old Buchanan mine, in Tuolumne county, are causing considerable excitement.

THE Great Register of Nevada county contains this year 5,309 names against 4,410 in 1894, an increase of 859 or nearly 20 per cent.

DRY WASHERS near Randsburg, Kern county, are reported to be taking out as high as two and three ounces of gold per day to the machine.

IN southern Oregon there is considerable activity in gravel mining, and a number of ditches are being dug for hydraulicking on large scales.

AT Leadville the managers of the larger mines are completing preparations to resume work with laborers imported largely from Missouri.

A MINING COMPANY, in which Missouri parties are interested, has been incorporated in Elko county, Nevada, with a capital stock of $10,000,000.

THE successful working of the smelting plant of the Mountain Mines Company at Keswick, Shasta county, is stimulating the opening of mines in that county.

THE returns of shipments of bullion, matte and ore from the mines and smelters of the southern Kootenay since the beginning of the year show a value of $2,437,506.

IT is again reported that the Slocan Star mine of British Columbia has been bonded—this time for $2,500,000. Within the past 18 months it has paid $250,000 in dividends.

MONTANA and Missouri capitalists are making arrangements to work the marble quarries near Springville, in Utah, in order to determine the value and quality of the deposits.

THE British Columbia Southern railway will apply at the next session of Parliament for a Dominion charter, and for authority to extend its railway through Crow's Nest Pass to Alberta.

THE total dividends of some Utah mines to date are as follows: Ontario, $13,295,000; Bullion Beck and Champion, $2,075,000; Silver King, $750,000; Mammoth, $1,090,000; Galena, $45,000; Utah, $149,500.

ACCORDING to the Black Hills *Times* there is a body of uranium ore exposed in a group of claims near Portland camp. A large porphyry dike runs through the claims, in connection with which the ore is found.

IN the Randsburg district, in Kern county, the owners of the Rand mine propose to erect a 40-stamp mill. It was supposed that the water question would be very troublesome in that district, but the sinking of wells has shown that considerable may be obtained.

OWING to the good work that has been done for several years past by the California State Miners' Association, several of the mining counties which have hitherto given it lukewarm support are now forming local organizations and beginning to show a commendable interest.

AUSTRALIA is far from well supplied with water in many of the principal mining districts. Sir John Forrest proposes to build a huge reservoir somewhere in the Darling mountains, capable of holding 5,000,000,000 gallons of water, to be conveyed in pipes through Southern Cross to Coolgardie, a distance of something over 300 miles.

AN indication of the mining boom in New Zealand is the fact that the Brokers' Association, which two years ago was glad to receive new members at £100, now demands £500 for admission, and refuses many applicants. Then the *Mining Standard* asks for the establishment of a mint at Auckland. There are already mints in New South Wales and Victoria.

THERE is more mining on the bars along the American river in Placer county than there has been for many years. There are several strings of sluices above the Rattlesnake bridge, at Horseshoe Bar, Doton's Bar and other points down the river. Several places along Miner's ravine are being opened up and will be worked during the coming winter.

THE business men of Ensenada have sent on a petition to the Mexican Government to have crude petroleum placed on the free list so far as Cedros island is concerned. There are extensive deposits of low-grade gold ores there which cannot be worked without the very cheapest of fuel, as there is no water power available. Hence they want crude oil from Los Angeles for making steam.

THERE is probably no other kind of metal deposit more eagerly sought after at the present time, more profitably worked or more permanent and reliable than a large deposit of copper ore in a primary formation, says the Butte *Miner*. In fact, practical experience teaches that such deposits rarely ever dig out within the depth limits at which mining operations may be successfully carried on.

IT is understood that the Exploration Company of London, to whom the Mariposa grant has been offered, are about to make an examination of the property. The grant comprises over 40,000 acres in Mariposa county, and within its borders there is without question a great deal of valuable mineral. Several mines on the grant have in the past paid well, but altogether the tract has been but slightly prospected.

QUARTZ MINING is coming rapidly to the front in southern Oregon, and the number of ledges which are being successfully worked refutes the theory that this country contains only surface or pocket ledges, says the *Democratic Times*. Deep mining is the salvation of any mineral country, and the time will ultimately come when southern Oregon will be the scene of some of the largest mining operations in the country.

J. A. CORAM of Lowell, Mass., one of the directors of the Merced Gold Mining Company at Coulterville, announces that it is their intention to begin soon the erection of the proposed electric plant for supplying the miners with power and light. It is proposed to take water from the Mokelumne river, bringing it by pipe eleven miles, and it is expected that they will be able to generate electricity enough to obtain 8000 or 10,000 horse power.

DURING the alteration of the smelter at Nelson it was necessary to take out the bosh and bottom of the blast furnace, says the Rossland *Miner*. The bottom of the furnace was of fire brick and the bricks were thoroughly saturated with copper, silver and gold. The mortar, or fire clay joints, had been completely eaten away and replaced by copper and silver. The mass, which weighed several tons, was estimated to be worth about $12,000, and required a great deal of hard labor to break up on account of its toughness.

THE question of economy in hoisting plants is one which will enter more largely into the calculations of Butte mine owners and lessees in the future than it has in the past, says the *Inter-Mountain*. With the big mining companies steam power will probably always be preferred, but there are thousands of smaller mines in this district where the character of the ore will not justify the expense of even a moderate sized steam plant. It is in the latter field that many believe the introduction of electrical machinery will yet work wonders.

THE United States lighthouse tender Mary Anita has returned from Alaska, where she went with Captain Gailliard of the United States Engineer Corps, twenty-five workmen and a quantity of material. They proceeded directly to Portland canal, which is a body of water extending about eighty miles inland, on the boundary between British Columbia and Alaska. The trip is a forerunner of others next season, and its purpose was to prepare a base of supplies for the parties which would be sent out by the Government to locate the boundary line between these two countries.

WE have been so accustomed this season to hear nothing but curses for the Cook's Inlet country that it is a positive pleasure to meet one person who has at least made his exsenses, to know there are quite a few others who have done equally as well, and that probably a dozen out of the 2000 who flocked to the Inlet this spring will clean up a comfortable stake in the fall as a result of their summer's work, says the Alaska *News*. It has long been known that 99 out of 100 of these alleged miners knew absolutely nothing of placer mining, and that the country in general would have to bear the brunt of their ignorance.

THE new law imposing a tax upon the net output of the mines has done more, perhaps, to demonstrate the importance of the industry in Utah than all other influences combined, says the Salt Lake *Tribune*. It has forced the managers of close corporations to divulge figures that have been hitherto jealously withheld from press and public, and in the record now in the offices of the Board of Equalization is to be found an index to some of the greatest bonanzas ever developed in the West. Not only does it afford information concerning the net output of the property, but also the cost of treatment, of transportation, and of every item of expense that is involved in the production of a ton of ore.

A LAND CONTEST as to the ownership of the properties including the old Guadalupe quicksilver mine, in Santa Clara county, is before the Land Office in this city. In the early '70s quicksilver ore was discovered in that locality, and the lands were surveyed for the Guadalupe Quicksilver Mining Company, which operated very extensively from 1875 to 1894, taking out a large amount of valuable ore. Since that time the mine has not been operated. Meanwhile the Commissioner of Lands permitted homesteaders to file homesteads on the claim, because the quicksilver company had not carried its claim into an application for a patent. As soon as the homesteaders filed and commenced to improve, the mining company filed an application for a patent. The Commissioner then ordered this hearing, in order to determine whether the land is really mineral, in which event the mineral patent would probably be granted to the exclusion of the homesteaders, or whether it is agricultural, as the latter contend.

THERE are not many good old-fashioned swindles based on California mines put upon credulous investors in the money centers of the world nowadays. The reason for this is not hard to find. Means for gathering information about mining properties in any of the older mining districts are plentiful. The swindler prefers to deal in mines in the new districts, in order to cover his tracks. That is why he goes to the newer mining fields to get a few barren locations for a basis for a brilliant prospectus. He is turning his attention to British Columbia considerably of late, but there he is meeting with a reception that will hardly give him much encouragement. They are a very earnest, honest set—the miners of British Columbia—made up of men from Canada and the United States, who, like all honest miners, give little encouragement to shams and humbugs. This is best shown by the papers published in that new section of the Northwest. There is hardly an issue of any of our exchanges from all that country that does not contain words of warning in this direction.

SOUTH AFRICA threatens to become overrun with coolies from India. The South African *Mining Journal* says on this subject: "At last, and not before it was needed, there seems to be a prospect that some sort of effort is to be made to restrict the tide of Asiatic immigration into South Africa. As regards the Cape, the Colonial Secretary, speaking lately at a meeting at Graaf-Reinet, said that the great influx of coolies into the country must be stopped. They could not longer throw open their doors to such vast hordes of Asiatics. The Premier, he said, had promised to look into the question, and it would be dealt with next session. Unluckily, the Imperial Government has the view that coolies, being British subjects, are at liberty to immigrate to any part of the Queen's dominions, and that same view has caused their multiplication here to an extent which, while it may not yet have become an overwhelming danger to the white trader, threatens to become so. They make their way here from Natal, which is the sinner in introducing them. That they are already found undesirable, even in far inland centers, would appear from the action lately taken in the Kimberley Borough Council, when an Indian who had purchased a municipal building lot found the sale cancelled on a matter, no great one, of non-compliance with regulations, the Council evidently desiring to stop the nuisance of having Indians living among the white population."

ACCORDING to the Spokane *Chronicle*, there is a railway deal on foot for building from the Northern Pacific up into the new mining districts of British Columbia. There are a number of projects under consideration to tap this vast and rich district, which is now without means of transportation. The Canadian Pacific has already run several preliminary surveys into that section, and is only delaying construction of a road awaiting its accustomed subsidy and land grant from the Canadian Government. August Heintze has lately returned from London, where he went for the purpose of raising money for building a road into this northern El Dorado. The attraction which draws the attention of all these railroad magnates is the products of the mines—refractory ores that must be carried to the smelters. This is another example, if any be needed, to show what a few mines can do towards opening up any unsettled country. In a few years the agricultural and other resources of that country will be developed. They will be developed, in fact, a quarter of a century sooner than they would have been but for the opening up of the mines.

THE best evidence of what it costs to produce an ounce of silver from the mines of Utah during the year ending June 10, 1896, is afforded in the returns of various diggings now on file in the office of Assessor Lynch, as required under the law, which imposes a tax upon the net output of the mine, says the Salt Lake *Tribune*. These returns are accompanied by affidavits in support of their accuracy. Among the biggest surprises contained in the stack of returns is that which comes from the Old Jordan and Galena, that in the production of nearly 20,000 tons of ore sustained a loss of over $13,000. The superintendence of the property alone involved an expenditure of over $13,000. The Phœnix Mining Company produced 632 tons of ore during the year at an actual cost of $9,000, which also shows a loss to the producer. The Lexington, whose earnings have for years been going across the waters to fill the Parisian's pocket, has sustained another big loss during the year, although A. Lavignino approximates the net output at $15,000. The Maxfield Mining Company through its manager reports the production of 100 tons of ore of a gross valuation of $6000. To obtain this the affiant says about $14,000 was expended. While one mine has netted its owner a few dollars, scores have dragged their owners into debt, while many have planted their money in holes in which it can never sprout. In the struggle to recover it, the returns show that the miner has made shipments upon which the profit was but 56 cents a ton, and that these lots were very rare. Putting the returns that have been made together, the showing is anything but a gratifying one.

THE native laborer in the South African mines does not go on strike. Wages are low, but if there appears at any time a scarcity of "boys," as they are called, and a likelihood of a demand that would raise wages, more "boys" are imported from the wilds. In a late issue the South African *Mining Journal* says: "After long and careful discussion by all the men who whether by their acquaintance with the financial aspects of the matter or by their practical mining experience with large numbers of boys, and by their knowledge of the country are most competent to form and to draw up the actual working form required, the great scheme for the reduction of native wages, by which an immense pecuniary benefit should immediately result to the mines, has been definitely put into shape, and will come into force on the first day of October." The committee appointed by the several mining associations reported—"first, that the present rate of wages shall be reduced; second, that the reduction shall be effected on the basis of the maximum rates of pay; that provision be made for a periodical examination of the companies' books by a duly qualified accountant, in order that the above mentioned scale may be adhered to; third, that the reduction shall take place from the first of October next; fourth, that a uniform method of conducting compounds is desirable, and that all details with regard to food, length of shifts, etc., be left in the hands of the Association of Mine Managers. Your committee has informed the Government of the proposed movement for a reduction in the rate of native pay, and has asked for its cooperation in the matter. Your committee suggests the advisability of all managers of companies joining the Association of Mine Managers. In conclusion, your committee urges the necessity of action in the matter of the reduction in native wages, this course being essential to the success of the movement."

THE New York correspondent of the London *Mining Journal* gives a list of American mines reported by the press as sold since the first of this year, showing that $5,799,558 was invested by American purchasers and $1,695,000 by British and French capitalists. He goes on to say: "It must not be supposed that the sales I have above noted represent even the major portion of the business actually transacted this year. Very many other sales have been reported in the public press since the 1st of January; and in the very newspapers from which I took the information here presented numerous additional purchases of mines were mentioned without the prices being set forth. Moreover, the total does not include any reference to the joint stock companies that have been formed in America during the present year for acquiring and working mining properties. These corporations are literally numbered by the thousand, and represent an actual cash capital of certainly more than $10,000,000. Altogether, it seems to me probable that American capitalists and investors have contributed upwards of $20,000,000 during the past eight months for the working of mines in the United States. In addition to what I have here mentioned, several enterprises of very great magnitude are on foot. The famous Anaconda purchase represents a huge sum, and is about to lead to a great development of the copper industry. W. P. Tarbutt and Edmund Davis, of your city, are said to have agreed to contribute $1,000,000 to the Crocker-Poniatowski enterprise of opening up some thirty or more hitherto undeveloped mines on the mother lode in Calaveras county, California, and working the same by means of electric power generated at a station up in the Sierra Nevada, where an ample supply of water with a 2000 feet head is available. Your 'Exploration Company,' of Rothschild's fame, is credited with intending to do great things in southern Oregon, where it has just purchased the Lucky Boy group of claims in the Blue River mining district, near Eugene city."

Gold Mining in California.

NUMBER III—CONCLUDED.

By AUG. J. BOWIE, Mining Engineer.

The cyanide process has come to the assistance of miners in working certain classes of gold ore, not certainly, as a new invention, as the chemical properties of cyanide of potash have been known for years and the cyanide used and patents taken out in different parts of the world* before the Mac Arthur-Forrest process was known. The economical manufacture of cyanide of potash has permitted its successful introduction under certain conditions.

The tailings from most of the gold mills in California and Dakota run so low in gold that it does not pay to concentrate them, and, in many other instances where the concentrates are made the quantity is so limited that it is more economical for the miners to sell this product to a smelter or chlorination works, than to erect a plant for his own use.

The Yield of the Transvaal Mines.—The annual report of the State mining engineer of the Transvaal (Mr. Klumke) for 1895 shows that the total yield of the Transvaal gold fields from 1884 to 1895, both years included—twelve years—was 9,749,110 ozs. of gold, aggregating £33,500,000.

The gross yields of the Transvaal for 1895 was £8,569,555, which, at $4.84 to the pound sterling, equals $41,476,646.20.

The Witwatersrand fields produced £7,693,691, or $37,233,464.54, or 89.77% of the total yield of the country. At the end of 1895 there were in force in those fields 92,305 prospecting and 3283 digging licenses.

The total tons crushed aggregated for 1895, 3,903,333, or 68.8% per cent of the total yield of the Transvaal, showing an average yield of $7.31 per ton in the mills. During the corresponding period 3,015,986 tons of tailings were treated by the cyanide process, being 26% of the gross yield, or $3.57 per ton; and 193,256 tons (4.48% of the yield) of concentrates were worked by other processes, producing $9.58 per ton treated.

It is reported that at the present date over 3000 stamps are at work in the Rand district. The gold production is large, but nothing wonderful, for California, which, as late as 1861, was producing over $41,000,000 in gold annually.

The benefits derived from the knowledge and experience gained in California have been applied in South Africa under exceptional circumstances, assisted by cheap labor ($12 to $15 per month), and the results obtained have been satisfactory to the owners of the mines.

Financial papers abroad report estimates of the probable yield of the Rand mines to the 2000-foot level for a distance of ten miles. Long experience in mining has proven the futility of any such conjectures. If the estimates of the yield of the Consolidated Virginia and California mines during the last bonanza days, where only a few hundred feet in length and depth were figured on, are compared to those reported of the Rand, one must be struck by the similarity of the gross sums stated in both cases to be obtainable, and the fate of the Comstock's visionary yield should act as a warning to all investors.

The total yield of the Comstock lode from 1859 to 1891, inclusive, was as follows:

Gold	$140,771,979 28
Silver (calculated at $1 29 per oz.)	197,674,649 69
Total	$388,446,628 97
From tailings, 1871–89	$ 12,709,039 71

Australasia and United States of America.—From data obtained from the *Mineral Industry*, it appears that the total output of gold from Australasia from 1851 to 1891, inclusive, was $1,690,137,137, and from the United States from 1792 to 1848 about $24,000,000; but from 1792 to 1892, inclusive, the returns were:

Gold	$1,969,692,942
Silver	1,158,831,896

Placer Mining.—Passing from the field of quartz mining to that of placer mining, official estimates of the amount of workable gold deposits along the rivers of the principal hydraulic regions, lead one to infer that the quantity is practically unlimited, but a comparatively small portion of the whole only is regarded as workable under existing conditions.

It is generally accepted that these deposits have been laid down by the action of a system of tertiary rivers, the waters of these rivers eroding the auriferous slates with the included quartz veins and concentrating the precious metals in deposits which, in places, have been covered by volcanic products.

From 1850 to 1855, inclusive, the gravel deposits of California produced $335,553,456. The impetus given to the production of gold by the introduction of hydraulic mining astounded the world and revolutionized the science of hydraulics. Necessity developed the fact that ditches could be constructed running large quantities of water on grades and under conditions which the text-books pronounced impracticable. Investigation and experience soon discredited the formulæ then in use for determining the velocity of the flow of water in open channels and pipes. Aided by observations and investigations at home and abroad, the formulæ of the old text-books have been exploded and discarded.

The introduction of riveted iron pipe in the crossing of canyons and valleys of 100, to 1000, 1700 feet in depth, (11½ to 30 inches in diameter) several miles in length and the delivery of water through these light wrought iron, (from .083 to .375 inch in thickness) constructions under tensile strains from 15,000 to 17,000 and as high as 23,460 lbs. per sectional inch was a revelation in hydraulices. Many engineers at present state, although aware of the result of the work executed in this State, still consider the life of these pipes, whose thickness is the mere fractional part of an inch, to be necessarily short. We have samples of pipe of No. 14 iron, B. G., which has been underground and in actual service over 30 years. The iron in this pipe is as good to-day as when laid down.

Our experience with steel pipe is limited to about 15 years and so far it appears to work well, but we naturally incline toward the use of wrought iron pipe on account of long experience with it.

There are many other devices which necessities have brought out and among others notably the development of the Pelton wheel.

Having discussed this question of legitimate and speculative mining, it can be stated that if a moiety of ordinary common sense be used in mining transactions which is practised in everyday business life, there is no industry which would offer more legitimate inducement for investment or could be safer than gold mining on this coast.

The strained relation between the farmers and miners has caused the loss of millions to the citizens of this State. I am sure I can voice the feelings of the miner, that he never desired to harm his neighbor in any form, and stood ready at all times to act fairly and extend the hand of fellowship. Whoever he damaged, it was just to compensate.

In a State which is so sparsely settled in comparison with its area, the people can ill afford to be antagonistic and this condition of affairs cannot continue.

The problem in which we are most concerned is that of harmonizing the mining and agricultural interests. The equation is not impossible to solve. The intelligence of this people will work its solution and the day when these industries "pull together" will be the brightest in the history of this State and will assure our prosperity.

*Hagen tests in 1805; Annales de Chimie et de Physique, 1805; Elkington, 1840; English Patent, Farraday, 1856; Jules H. Rae, U. S. Patent, 1867; Clark, 1880; Faucett, 1881; U. S. Patent, John F. Sanders, 1881; U. S. Patent, Ashley Price, London,; English Patent, 1884, Jerome W. Simpson, 1883; U. S. Patent MacArthur-Forrest Patent.

Gold in the Guyanas.

The following notes are taken from a paper by Henry G. Granger read at the Colorado meeting of the American Institute of Mining Engineers:

Paramaribo is the source of all labor and food supplies in Surinam. Labor has to be contracted before a commissioner, for a period of from three to four months, at the rate of 125 guilders, or about 50 cents gold per day, with rations and medicines free. Claims are taken up by going to the Government office and designating on a map the locality desired, having the quantity of land, not less than 200 hectares, (the hectare is 2.47 acres), marked off by scale and paying a year's tax. For the first three years this tax is 4 cents in gold per hectare, for the fourth 10 cents, and for the fifth and subsequent years 20 cents per hectare. If one desires to prospect new ground a certain number of leagues distant from any working placer, a large tract may be marked off, free of taxation for the first year. It is against the law to prospect or work ground that has not been regularly taken up.

The following are the six principal placers, with their reputed yields and present condition:

Barnett's	$3,000,000	Producing.
Green's	1,000,000	Producing.
Mueller's and de Joug's	500,000	Producing.
Dr Solomon's	500,000	Shut down.
Montana mine	250,000	Producing.
Savanna mine	150,000	Shut down.

There is an export duty on gold of 5 per cent.

The question naturally arises: What does the future offer for gold mining in Surinam? Quartz mining, with the proper men to develop it, should have a future in this country. Up to the present time it is an absolutely virgin field. A number of veins are known, some of them carrying free gold, but not a step has been taken to develop this branch of the industry. Regarding placer mining, the writer is of the opinion that, under the present conditions of labor contracts and transportation of food supplies, all the ground within available distance that is of any value has been taken up. The great interior, higher and healthier, is untrodden by the prospector's foot. Surinam, though a colony of Holland, has the management of its affairs in its own hands.

TABULATED STATEMENT SHOWING THE RELATIVE COST OF MINING AND MILLING PER TON IN CALIFORNIA, ALASKA AND SOUTH DAKOTA.

Elevation above Sea Level	Name of Mine.	Location.	Greatest Vertical Depth	No. of Stamps.	Cost of Mining, per ton	Cost of Milling, per ton	Total Cost, per ton	Yield, per ton.	Wages, per diem	Remarks.
1600 ft.	Kennedy	Amador Co., Cal.	2000 ft.	40	.....	.....	$5.21	$15.30	$ 2.50	Deepest workings 400 ft. below sea level.
.....	Plumas Eureka	Plumas Co., Cal.	.....	60	$3.52	$ .49½	4.01½	6.73	65.00 per month & board.	$.34 per ton should be added to total cost, which includes reduction of sulphurets, general and office expenses. Report ending Jan. 31, 1888.
.....	Sierra Buttes	Sierra Co., Cal.	2400 ft. on vein	90	4.73	.53	5.26	6.18	65.00 per month & board.	
1050 ft.	Plymouth	Amador Co., Cal.	1600 ft.	160	2.34	.39	2 73	7.59	.....	
1150 ft.	Gover	Amador Co., Cal.	700 ft.	20	3.50	1.00	3.50	.....	.....	
900 ft.	Bunker Hill	Amador Co., Cal.	680 ft.	40	3.35	.60	3.95	.....	2.75	
1000 ft.	Keystone	Amador Co., Cal.	1024 ft.	40	.....	.75	.....	.....	2.75—3.00	
1180 ft.	Wildman	Amador Co., Cal.	565 ft.	10	.....	.60	.....	.....	2.75—3.00	
1100 ft.	South Spring Hill	Amador Co., Cal.	783 ft.	30	2.50	.65	3.15	.....	2.75—3.00	
.....	Alaska Treadwell	Alaska	500 ft.	240	.6466	.7073	1.3539	.....	.....	Official report ending May 31, 1894.
.....	Homestake	South Dakota	.....	300	2.604	1.24	3.844	4.80	3.00	Official report year ending June 30, 1896.
.....	Father De Smet	South Dakota	350 ft.	100	.....	.....	2.12	3.55	3.00	Official report of 1895.

TABULATED STATEMENT SHOWING THE RELATIVE COST OF MINING, MILLING, ETC., PER TON, ON THE RAND, SOUTH AFRICA.—COMPILED FROM OFFICIAL PUBLISHED REPORTS.

Name of Mine.	Stamps.	Cost: Gen'l Ex. Mining.	Cost: Milling.	Total Cost Mining, Milling, Etc.	Yield, per ton, in Free Gold.	Cost: Tailings, Cyanide.	Cost: Concentration.	Yield: Tailings, Cyanide, per ton.	Yield: Concentration, per ton.	Remarks.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Van Ryn G. M. Estates, Ltd.	50	16 7.22	3 0.34	1 7 4.17	1 3 7+	1 11 0.71	....	1 11 4	.....	April, 1896.
Van Ryn G. M. Estates, Ltd.	50	15 10.12	3 1.97	1 7 0.02	1 2 5+	1 10 11.40	.....	1 9 7.85	.....	May, 1896.
Van Ryn G. M. Estates, Ltd.	50	15 9.96	2 7.35	1 7 1.65	1 2 3+	1 11 8.29	.....	1 8 3.11	.....	June, 1896.
"The Jumpers" G. M. Co., Ltd.	100	11 8.15	6 10.62	1 8 6.77	1 11 10	4 7+	.....	6 5+	2007 10 0*	May, 1896. * Total value only given.
"The Jumpers" G. M. Co., Ltd.	100	13 5.74	6 6.13	1 10 1.77	1 8 7.80	4 0.12	.....	7 2.52	955 0 0*	June, 1896. * Gross yield.
Crown Reef G. M. Co., Ltd.	120	17 1.653	2 1.164	1* 4 10.473	1 6 9.023	2 10.191	.....	14 4.577	.....	June, 1896. * Includes general charges development and cyanide.
The Jumpers G. M. Co., Ltd.	100	13 3.31	7 5.43	1 9 6.70	1 11 10	6 5	.....	4 7+	1776 0 0*	April, 1896. * Gross yield.
The Ferreira G. M. Co., Ltd.	.....	17 7.18	6 0.85	1 3 8.03*	3 1 0.24	....	.....	18 3.36	26 0 4.56	Report for quarter ending June 30. * Cost of reduction of tailings and concentrates included.
Langlaate Estate G. M. Co., Ltd.	160	12 9.48*	3 5.64†	16 3.12	1 5 3.84	4 1.44	10084 16*	7 9.60	57241 8 2	Year ending Dec. 31, 1895. * Includes general expense account. † Includes transport account. Total yield of concentrates and cost given.
Association of Mines of the South African Rep.	695	.....	.....	.....	1 3 6	....	.....	13 4	6 13 0	No costs given. Statement published for June, 1896. Tonnage 73,531 at mill.
Block B. Langlaate Est. G. M. Co., Ltd.	80	16 10.40	3 5.52	1 0 3.92	19 4.08	4 11.40	3 3 8.76	6 5.40	5 12 9	Annual report year ending Dec. 31, 1895, gives value per ton from all sources at £2 2s.
Randfontein Est. G. M. Co., Witwatersrand	60	1 15 9.12	6 5.28	2 2 2.45	1 18 0.12	2938 0 4*	303 17 5*	4397 16 0*	1166 3 0*	* Total yield and cost of tailings and concentrates given in table. Report year ending Dec. 31, 1895.

Cost of labor at South African mines is from $12 to $15 per month.

Its people are intelligent and anxious for progress. It is very probable that any responsible parties who would go to the Government with something like the following proposition would meet with acceptance: Selecting a tributary to, say, the Saramacca river, flowing from the west, which could not be reached in less than, say, sixteen days' canoeing, ask the Government for an exclusive concession for forty years (the term of all their mine grants) for all of the teritory south of the chosen tributary and west of the river, upon the condition of payment of export duty for all the gold taken out, a monthly tax of, say, $100, and non-abandonment for over one year. The concession should include the right to introduce laborers from the West Indies (where they are a drug on the market) on contracts of not less than a year, and police authority over them.

Gold in Granite and Plutonic Rocks.*

By WILLIAM P. BLAKE, Tucson, Arizona

(*Condensed.*)

A recent paper by Prof. George P. Merrill, curator of the Department of Geology of the U. S. National Museum, Washington, upon "An Occurrence of Free Gold in Granite," describes an interesting instance of the dissemination of this noble metal in the substance of granite of normal composition believed to be from Sonora, Mexico. He found the gold in small scales, rarely exceeding a millimeter in diameter, distributed through the scales of mica and apparently enclosed in both the feldspar and quartz granules. A number of thin sections of the rock submitted to examination with the aid of the microscope gave confirmatory evidence. Sulphides were not detected, nor any indication of a secondary impregnation, though the granite had undergone some alteration, apparently by weathering. Mr. Merrill concludes that "there is apparently no way of accounting for the gold other than by considering it an original constituent of the rock, a product of cooling and crystallization from the original magma."

We have thus another link in the chain of evidence showing that gold is a constituent of granite and plutonic rocks, and that such crystalline rocks may be the primal source of the gold which is concentrated in veins.

We do not, however, overlook the fact that the oceans may have contributed a portion of their dissolved gold to the sedimentary rocks, such as the slates, magnesian or otherwise, of different geological epochs; such slates being generally known to us as country or wall rocks of most of the auriferous quartz veins, especially of the central gold region of California.

As investigation progresses, and our knowledge is increased, it becomes more and more evident that such pyritous sediments derived their metallic contents from the waters of the ocean at the time of their sedimentation, through the reducing agency of organic matters or the exhalation of sulphuretted or carburetted gases, as for instance, from the petroleum shales.

We encounter here the difficulty that gold is not uniformly present in pyritous deposits, as we might expect considering the universality of the oceanic source, and the general distribution of gold in this menstruum. But before we can generalize satisfactorily we require much more evidence regarding the dissemination of gold in the mass of the various kinds of rocks, independently of veins.

It is only within a few years that the instances of the occurrence of gold in the crystalline rocks have multiplied until we cannot longer regard them as exceptional, or hold that gold, as a rule, is confined to the magnesian and argillaceous slates.

One of the earliest cited and best examples of the occurrence of coarse, free gold in the midst of granite, seemingly without any extraneous origin by impregnation accompanied by quartz, was at the Armagosa gold mines at the sink of the Mojave river, San Bernardino county, Cal.

The native gold in visible masses was there disseminated in the midst of the aggregation of soda-feldspar (albite) and the quartz, as if an original constituent of the mass and indigenous to the rock, which it may have been. Pyrites were not present in the specimens obtained; but some fragments of white arsenic in granite from the same locality may be regarded as an indication of the former presence of an arsenide in association, and as possibly an impregnation subsequent to the formation of the rock.

The influence of dikes of plutonic rock upon the mineralization of veins with the precious metals has long been known and recognized by miners.

If we accept the theory of lateral secretion for the formation of mineral veins, such veins bearing the precious metals are perhaps as good evidence as we need of the diffusion of gold and silver in the mass of the adjoining country rock, or, at least, that solutions bearing these metals may traverse the rocks by osmosis or otherwise. If such evidence may be admitted, the range of the phenomena and of the evidence is widely extended.

Some of the most notable districts in California where gold-bearing veins traverse crystalline rocks of the granite family are at Grass Valley and Nevada, Nevada county; also at Forbestown, Butte county; Ophir, Placer county, and West Point, Calaveras county. In these localities the veins are numerous, and appear to have been formed from the substance of the country rock. In Mariposa county, at the southern end of the Mariposa estate, where the slates of the Jura-trias age, with their accompanying large mother vein, give place to granite, we find a vein of auriferous quartz which may not have any relation in origin to the vein in the slates, with which the vein in the granite contrasts strongly in its formation and in the distribution of the gold. It is known as a "pocket vein," yielding the gold in isolated but rich bunches, and of a higher grade of fineness and less crystalline than the gold of the Princeton vein, which traverses the secondary slates. It would be instructive to determine the relative ages of these adjacent veins and the influence of the two different kinds of country rock upon the deposition of the gold. It would be extremely instructive if we could find an instance of a gold-bearing vein passing from one formation into another, as, for example, from slates into compact granite, so as to exhibit the effects of change of country rock, or of the walls upon the mineralization of the vein—effects so strikingly shown in the lodes of Cornwall, which are copper-bearing in the "killas" and tin-bearing in the granite. It should be mentioned that the tin lodes are not without some gold, being thus indicative of its presence in the granite.

The well-defined granite rock of Butte and Walkerville, Mont., affords conspicuous examples of gold-bearing and silver-bearing veins, originating apparently by lateral secretion from the body of the granite on each side. The Rainbow and Blue Bird lodes especially appear to have derived their mineral and metallic contents from the granite in much the same way as the tin-bearing lodes are formed in Cornwall, according to the investigations of Le Neve Foster.

The occurrence of gold in thin flakes upon the surfaces and in crevices of the porphyry at the famous Contention mine at Tombstone, Arizona, has been shown; but it is not yet known with certainty whether this gold, either in its free state or combined with disseminate pyrite, was an original constituent of the dike, or whether it was derived from the diffused pyrites of the stratified beds traversed by the dike. So far as regards the plainly visible gold, it appears to be confined to the partly decomposed portions of the porphyry dike, at or near the contact with the other rocks, and to be a secondary or late deposition, and not indigenous.

The mines of the Homestake group in the Black Hills of Dakota afford a good example of the occurrence of gold in ancient crystalline gneiss or granitic schists of pre-Cambrian age. These schists are much plicated and are traversed by felsitic dikes, distinctly intrusive. Whether these are auriferous or not remains to be ascertained, and without a careful examination it is not possible to state the source of the gold, whether indigenous to the schists or introduced from the dikes or with quartz veins from remote sources. The rock for the stamp mills is quarried, rather than mined in the manner usual with veins, and this rock is milled together with any veins traversing it.

The ore of the Treadwell mine, Alaska, is described by Adams and Dawson as a hornblende-granite, "much crushed, altered, and impregnated with secondary quartz, calcite, and pyrite." The pyrites contains the gold.

In the gold-bearing region of northern Sonora, Mexico, the gold veins are chiefly in or closely associated with granitic and plutonic rocks. The veins of El Grupo concession, about 100 miles southeast of Tucson, Arizona, traverse a fine grained granite, and bear both gold and silver. A dioritic rock at El Plomo, in the same State, appears to be especially favorable to the occurrence of gold. At the San Francisco mines, 100 miles southwest of Gila Bend, Arizona, gold-bearing quartz veins traverse Huronian or pre-Cambrian gneiss near or at the contact with a great dike of diorite on one side and of porphyritic granite on the other. El Campana, a large quartz vein, also in Sonora, is at the contact between an obscurely defined felsitic rock, like granite, on one side, and a heavily-bedded quartzite (probably Cambrian) on the other.

In central and northern Arizona gold-bearing veins are found in granite. The famous Congress vein now worked to a depth of some hundreds of feet, traverses granitic rock in close association with a dike of plutonic rock. North of Indio, on the Colorado desert, California, in the second range of mountains a ridge of granite contains irregularly spread patches or bunches of pyrite which, by decomposition, liberate a small amount of gold. This pyrite does not appear to be connected with any vein, but seems to be one of the original constituents of the rock. Somewhat similar pyritic impregnations in granite were worked a few years since in Arizona, near Peeples valley and Rich Hill, north of Stanton, and yielded free gold.

The close association of gold and granite at Cripple Creek must not be overlooked. Some specimens of porphyritic granite with cavernous spaces partially filled with purple or amethystine fluorite are very rich in gold.

Penrose, in summarizing Chapter IV. of his monograph of the mining geology of the Cripple Creek district says:

The phenomena of the occurrence of the precious metals in the celebrated Mercur mining district, Utah, furnish evidence which may be used in support of either view of the primal source of these metals. Both sedimentary and plutonic rocks are there found in conformable layers, and gold has been found in both, but the commercially available deposits are long and near the plane of contact of porphyry and limestone, but below the porphyry, the deposits thus being what is ordinarily described by miners as a contact deposit.

In the representative series of gold specimens and ores sent by the Minister of Mines and Agriculture from New South Wales to the Columbian Exposition in Chicago in 1893, there were numerous specimens from granitic and feldspathic lode-stuff. Examples of the presence of gold in granitic and plutonic rocks might be multiplied, but those given are sufficient to show that we must recognize such rocks as truly gold-bearing.

* Trans. Am. Inst. M. E., Colorado Meeting, Sept., 1896.

A Cheap Cyanide Plant.

Written for the MINING AND SCIENTIFIC PRESS by M. A. KNAPP, Hawthorne, Nevada.

The erection of a cyanide plant is, as a rule, a rather expensive proposition; and for the benefit of any readers of the PRESS who may wish to put up a cheap and efficient plant to handle a small lot of tailings, or as an experimental plant preparatory to a more expensive and permanent one, I offer these notes of a small and a successful cyanide works constructed at Hawthorne. The means used to overcome some of the difficulties encountered may be of interest also to managers of more extensive plants.

The conditions here were rather peculiar, as the lot of tailings to be leached were from an arrastra, and extremely slimy, fully two-thirds being clean slimes. This drawback was compensated, however, by the fact that they had settled from intermittent flows (every twelve hours) from the arrastras, and in consequence were finely stratified, the fine micaceous minerals separating the layers. If these lumps of slimes were once thoroughly dried, upon soaking with water again they would crack and flake throughout, and allow thorough leaching. By repeated tests I have found that lumps 3 inches in diameter, if near the top of the material in the vat, would leach excellently, although the aim was to handle considerably finer stuff. As any heavy pressure would pack such material, the vats were built very shallow, being 2 feet deep and 12 feet square. The first solution was added slowly from the bottom, and care having been used in putting the material into the vat lightly, without tamping, I found but little tendency to settle as long as the surface of the solution or wash water did not fall below the level of the top of the tailings in the vat.

The small amount of material in sight to be handled would not justify the purchase of expensive tanks, especially since an exceptionally large amount of leaching surface was required, owing both to the shallowness of the leaching and its extreme slowness in this slimy material. A cheaper method of building vats had, therefore, to be found; and after a few experiments the following was adopted: A row of seven boxes, 2 feet deep and 12 feet square, braced from the outside every 4 feet, was built, surfaced lumber, 1½-inch stuff, being used throughout; but no extra precaution being taken in the construction beyond thorough nailing. Over the cracks strips of canvas 3 inches wide were laid on top of a streak of hot (but not boiled) asphalt—grade D of the California Asphalt Company. A sheet of canvas of medium weight, 16 feet square, sewed with double seams, was then laid down in the vat and folded up in the corners, the side next the board being covered with a good layer of hot asphalt just as it was laid, causing it to stick fast to the wood throughout. The upper edges were tacked to the vat, no other tacks being put through the canvas. The inside of the canvas lining was then thoroughly asphalted, with special care about the corners. The vat floor inclined 1½ inches in 12 feet, both east and north. In the northeast corner, 1 foot from sides, the floor had been cut ⅝ inch deep in a saucer-shaped depression, and a hole for a 1¼-inch pipe bored. This was put in through a hole in the canvas and bolted tight in hot asphalt with 3-inch washers on the canvas and on the plank below.

Filters were of double burlap on 1-inch square strips, 1 inch apart, laid diagonally on the canvas bottom to within 6 inches of the sides, these held in place by canvas strips tacked across. Four strips—1x4x11 feet 6 inches—cut at 45° angle on corners were laid around the bottom of the vat, a small roll of burlap being tacked to the thin under side, which stuck to the still warm asphalt. To these strips was fastened the burlap filter.

The outlet pipe bent at right angles 3 inches below the vat. A short piece of hose was wired on it, and into the end of the hose was pushed a wooden spigot,

which drained directly into a 2x4-inch launder running alongside the vats to the zinc house. This launder was lined with a strip of asphalted canvas, and covered tightly except at the spigots. The same method of preventing leakage by means of asphalt and canvas was used in the construction of zinc boxes and solution tanks, the latter being built on the same general plan as the vats.

The pumping from sump tank to old solution tank was done by a small-sized Pelton motor, so set that the waste water from it could be used in leaching. Solutions were carried to the vats from the tanks by means of rubber hose.

So much for the construction, which was certainly cheap; and I will warrant that it was also efficient, though I would not recommend the use of vats of this description in any case when the proposition would warrant the erection of substantial, well-built wooden tanks. With proper care, however, in the use of well-seasoned lumber and good grade of asphalt, these vats last very well. A leak is easily mended by a new coat of asphalt, and this should be applied every four or six weeks as a precautionary measure. The tanks and vats here have given excellent service, and are now being used to leach tailing from a 5-stamp mill since built on the ground.

Among some of the difficulties encountered here I found, early in my experience, that the solution coming from the vats was too weak to precipitate on the zinc properly, and therefore added a little of a strong, strengthening solution to it before it entered the zinc boxes. Also, trouble was encountered by use of very coarse zinc shavings procured in San Francisco. Later on a very fine, flossy zinc answerd far better.

My first cleanups were made by burning off the fine zinc in large crucibles and fluxing the residue with borax and soda, a very dangerous proceeding, not alone from the loss of silver with the zinc, but in consequence of the liability of salivation from the fumes of mercury, which is caught by the cyanide along with the gold and silver of the tailings. The method employed later, resulting in a great saving of time, fuel and crucible, was to eat the most of the zinc with dilute sulphuric acid in asphalt-lined barrels, filter through a close linen cloth, dry slowly on an iron plate, stirring to prevent caking. Beware of mercury poison here also. Mix thoroughly with about equal bulks of powdered soda and borax. The borax is first dried, so as to boil away the water in it, and then ground fine. A thorough mixing of the powdered material makes it possible to melt very quickly and easily in a hot fire, and saves the black lead crucibles from corrosion.

How To Frame a Report.

The following blank form of report was framed to assist practical miners and mine owners, who may lack the technical knowledge of the mining engineer, in making a comprehensive report on such mining properties as they desire to present to investors. It is condensed from a blank form copyrighted by Bernard MacDonald of Butte, Montana:

REPORT ON THE

.....group of mines,
by.....

.....
.....

DEAR SIR:—The undersigned beg to submit to your consideration the following report on the.....lode claims comprising the.....group.

Number of Claims, Area and Date of Location:

The....claim is..ft. long by..ft. wide, located....189
The....claim is..ft. long by..ft. wide, located....189
The....claim is..ft. long by..ft. wide, located....189
The....claim is..ft. long by..ft. wide, located....189
Total area of group about.....acres.

Geography:

This.....claim.....situated in.....mining district....organized, ... county, ...State, and ....distant in a.....direction.....miles from..... the nearest railroad station. The county seat (.....) is distant....miles in a....direction, and is reached by.....over.....

Historical:

The.....mining district was first discovered in 18..by.....

(The first discoverers and namers of the district, the first claims located and worked, the principal historical events and mining operations that have occurred in the district till the present time should be given under this heading. Such information can generally be had with sufficient accuracy for the purpose of the report from the pioneers of the district. All recorded transactions can be obtained from the county records when desirable. Parties largely interested in any mining district should take a pride in collecting and writing up in chronological order all the historical information connected with it. The first mining failures in a district do not detract from its merits, and if frankly told would probably lead to early investigation and perhaps a solution of the causes. Mining newspapers in the district will gladly publish accounts, and a clipping of this would be suitable for this section of the report.)

Accessibility:

From.....station on the.....railroad, this property is reached over.....miles of.....wagon road and.....miles in length—a total length of.....miles from the railroad. The elevation at the mine..is.... feet higher than the railroad station, and.....feet above sea level.

.....
.....

(The blank lines may be filled ont with estimates for the building of new wagon roads, trails, or for the improvement of existing ones.)

Titles:

Title to.....of th..claim..is vested by the right of location, and title to.....of th..claim..is vested by United States patent.. There is.....dispute or counter claim to the present owners' possession of these claims. There is.....indebtedness or incumbrance against the property amounting to $.....due..... This form is filled on information from.....

(The number of claims in the group held by right of location and the number by United States patents should be given here. It should be ascertained whether there is any dispute for the possession of the property, or litigation pending; also whether there is any debt or incumbrance against the property, and the facts stated. These can be found by consulting the county records. The authority for such information should be given at the bottom of the form.)

General Characteristics of Vein...:

The.....vein..ha..the following characteristics: Strike.....; dip.....degrees from the horizon; width varying from .....feet; outcrop.....traceable for a distance of.....feet; hanging wall.....; foot wall.....; vein filling.....; oxidized ore extends down about.....feet.

Geology:

The country rock on the hanging wall of th..vein.. is.....; on the foot wall side it is.....; dikes of .....occur..... The country surrounding the immediate vicinity of the mines is composed of..... and is drained by.....creeks, tributaries of the .....river.

(The names of the rocks enclosing the vein on foot and hanging wall sides should be given here, and the class and character of the dikes, if any, occurring in the neighborhood of the veins should also be filled in. The character of the country rock surrounding the immediate vicinity of the mines should also be given, and the names of the creeks draining the hills or mountains on which the mines occur, and the river into which they empty. Mine owners should make a thorough study of the formation enclosing the veins, and the dike system (if there be one) occurring in the neighborhood. For the time necessary to spend for this work, nothing pays better. A thorough understanding of the geology of the country enclosing the veins frequently gives its possessor the key to the bonanza ore bodies of the group.)

Developments:

On the.....claim there are: ....shaft.....; ....open cut.....; ....tunnel.....; ....drift .....; ....raise.....; ....winze .....

(It is very important that all development work should be accurately measured and located with reference to the boundaries of the claim and position of the vein, and this should appear on the maps forwarded with report.)

Mining Facilities:

FUEL—For this there is a.....supply of timber. Cordwood costs $.....per cord delivered at the mine. Coal costs $.....per ton delivered at..... Charcoal costs $.....per bushel at the mine.

MINING TIMBER AND LUMBER—Timber for stull and tunnel sets ranging from....to....inches in diameter can be delivered at the mine at a cost of from ....c. to ....c. per running foot. Lagging poles cost ....c. per 15-feet lengths. Lumber at a cost of $.....per thousand at.....

WATER—For domestic purposes, there is..... water within....feet of the mine. For steam purposes, there is.....water within....feet of the mine. For power purposes, there is a flow of.... cubic feet, for which a fall of....feet can be had at a suitable site for a plant by taking it through a ditch ....feet in length. Such a ditch could be built for $.....per rod.

SUPPLIES—Hardware, etc., can be had at..... prices, with freight of....c. per lb. added. Farm produce.....flour costs from....c. to....c. per lb.; potatoes,....c. to....c. per lb.; beef,....c. to....c. per lb.; ranch butter,....c. to....c. per lb.; creamery butter,....c. to....c. per lb.; canned fruit,$.... per case; oats, $....per 100 lbs.; hay, $....per ton. General groceries cost a trifle over.....prices.

LABOR—Miners' daily wages, $....; carmen's daily wages, $....; teamsters' monthly wages, $....; carpenters' daily wages, $....; blacksmiths' daily wages, $....; common top labor, daily wages, $... ; four-horse teams, with teamster, daily wages, $....

CONTRACT WORK—Cross-cut tunnels, 4½x6½ feet in the clear, can be run by contract for $....per foot; drifts on veins, 4½x6½ feet in the clear, can be run by contract for $....per foot; raises on vein, 4½x6½ feet in the clear, can be run by contract for $....; incline shaft on vein, 5x7 feet in the clear, can be sunk for $....per foot.

Ore Tonnage in Sight and Value Thereof:

In the.....claim there are about.....tons of ore in sight, having an aggregate value of about $..... per ton. The ore is exposed by the.....

(In calculating the tonnage and value of ore "in sight" in a mine, the most conservative practice demands that three sides of the ore body be exposed by the developments, but this in all cases is not necessary. If the vein is regular, an ore chute cut by several levels may be considered sufficiently developed to admit of close calculation as to its tonnage and value of the ore above lowest level. Two sides of an ore body may be oonsidered sufficient for this calculation, allowing a one-third discount when the developments of a mine are limited and the ore chutes are not known to be regular. It should be stated plainly by what developments and their dimensions the ore is placed in sight.

Assays:

Samples taken by.....and assayed by.....ran as follows:

No.	Description.	Gold, Value per ton.	Silver, Ounces per ton.
1.	.....	$.....	.....
2.	.....	.....	.....
3.	.....	.....	.....

Gold calculated at $20 per oz.
Silver calculated at....per oz. Gen'l average, $....per ton.

(The description of samples assayed should clearly express the character of the ore, the width of the streak or vein, and the locality from which it was taken. The name of the party by whom the samples were taken, and that of the assayer, are to be given. While, in order to learn the characteristics and the grade of the various classes of ore in a mine, it is necessary to take a number of specimen or characteristic samples, yet such samples do not furnish the proper data to estimate the average value of the ore upon. Cold average samples of the various streaks in the vein, if it is wide and carries different grades of ore, should be taken, and these should be checked by average samples of the entire vein.

Shipments and Proceeds:

There have been....tons of first-class ore shipped to the.....which netted $....per ton. Also.... tons of second-class ore to the.....which netted $....per ton....

Estimated cost of mining this ore, $....per ton....
Cost of wagon transportation, ...per ton....
Cost of railroad transportation, ...per ton....
Cost of treatment, - - - - - ....per ton....

Total expense, - - - - - $....per ton....

(This blank is to be filled from the statements of settlement had from the reduction plants to which the shipments were made; and it would be proper if duplicate statements were enclosed with the report, or the accuracy otherwise attested.

Reduction Plant:

The ores of this property are suitable for reduction by the.....process.. A reduction plant of this character, of....tons daily capacity, will cost, erected and ready to run, $.... Estimate by.....

(When the ores below water level are sufficiently developed they should be sampled by a series of practical milling tests in various reduction works to ascertain the methods best adapted to their reduction. When the proper method and capacity of plant have been decided upon, proposals for the erection of such a plant should be asked of the various manufacturers. Their offers, the character and capacity of the plant should be inserted in this blank. If the mine is not sufficiently developed for such an estimate, the writer can make a forecast in his own words of the probable best method of reduction.)

Estimates of Profit with Plant Recommended:

....tons per day of assay value of $....per ton, $....
Loss in treatment....per cent, - - - $...
Cost of mining....tons, at $....per ton, ...
Cost of transpor'n...tons, at $...per ton, ...
Cost of reduction....tons, at $...per ton, ...
All other items of expense, say $...per ton, ...

Total cost, - - - - - - - - - - $....$....

Net profit per day, - - - - - - - - - - $....
Net profit per month, $....

(Liberal estimates should be made of all items of expense, as these for the first year or two generally run higher than in plants longer established.)

Prices and Terms of Sale:

The parties .....will sell for $....payable in..... installments of $....each. First.....; second..... months thereafter.....; or they will lease and bond it for.....years.....under the following conditions: .....

Enclosures:

Herewith please find enclosed: Maps.....; assays.....; report..by.....; letter..by.....; newspaper clippings from.....; photographs.....

(Under this heading should be given a list and description of maps, assay certificates, reports and letters, with names of writers; newspaper clippings and photographs of the mine in question, which are sent with report. All these go to make up the evidence necessary to investigation of the merits of the proposition.)

Directions and Time Necessary to Reach the Property:

.....

Recommendations:

.....

Electrical Progress.

Electric Mining.

The following notes are taken from an interesting paper on "Electric Mining in the Rocky Mountain Region," by Irving Hale of Denver, read at the Colorado meeting of the American Institute of Mining Engineers:

Conditions Affecting the Cost of Plant.—The cost of an electric transmission plant depends chiefly on three conditions:

First.—Nature of water power (assuming such power to be used) and cost of developing it.

Second.—Distance of transmission.

Third.—Electro-motive force or voltage used.

In order to show more clearly the effect of distance and voltage on cost of plant, it may not be inappropriate to state briefly the principal electrical laws involved in the problem.

Electrical Laws and Formulæ. (1) Electro-motive force, "pressure" or voltage (symbol, E. M. F. or E.; unit, the volt) corresponds to pressure of water in pounds per square inch, or head in feet.

(2) Current (symbol, C.; unit, the ampere) corresponds to flow of water in cubic feet per second.

(3) Power (symbol, P.; unit, the watt) corresponds to the power of falling water, and is equal to the product of electro-motive force and current, just as water power is proportional to the product of pressure or head and flow. 1 Kilowatt = 1000 watts. 1 H. P. = 746 watts. 1 Kw = 1⅓ H. P. Formula, $P = EC$.

(4) Resistance of a conductor to the transmission of electric current (symbol, R.; unit, the ohm) corresponds to the friction of water in a pipe. This resistance is directly proportional to the length of the conductor, and inversely proportional to its area of cross-section.

(5) The electric current is equal to the electro-motive force divided by the resistance. This is also analogous to the flow of water, which increases with the pressure and decreases as the resistance or friction increases, although the law is not exactly the same.

Formula (Ohm's law), $C = \frac{E}{R}$.

(6) Energy wasted in a conductor by being converted into heat (symbol, H.; unit, the watt, as before,) corresponds to the waste of power, also converted into heat, by the friction of water in a pipe, and is equal to the square of the current multiplied by the resistance.

Formula, $H = C^2R$.

(*A*) From (4) and (6) it is evident that increasing the distance, and, consequently, the length of wire (other things remaining the same), will proportionately increase the resistance and the loss of power; but if the cross-section of the wire is increased in the same proportion as its length, the resistance and loss will remain the same. This, however, increases the weight of the wire as the square of the distance. Hence the law: For a given power and electro-motive force (which fixes the current) the cost of copper, for a specified percentage of line loss, varies as the square of the distance.

(*B*) From (3) it appears that the same power is obtained from high electro-motive force or voltage and small current as from low voltage and proportionately large current—another analogy to water power. But (6) shows that the loss of power varies as the square of the current, and hence *inversely* as the square of the voltage. If the loss (C^2R) is to remain the same, R can be increased as much as C^2 is decreased, or as much as E^2 is increased, which means that the cross-section and weight of the wire will be inversely proportional to E^2. Hence the law:

For a given power and distance the cost of copper, for a specified percentage of line loss, varies inversely as the square of the voltage.

(*C*) combining (*A*) and (*B*) the following law is established:

If the voltage is increased in proportion to the distance, the cost of wire for transmitting a given power with a specified line loss remains constant.

Considering the fact that the total cost of steam or water power, electric generators, switchboard and motors seldom exceeds $150 per kilowatt, it is evident that when a distance is reached that makes the cost of wire (and transformers, if used) exceed that amount, or the entire cost of the remainder of the plant, that distance may be considered to be near, if not beyond, the economical limit, unless the conditions are peculiarly favorable for electric power.

With 500 volts this condition is reached inside of three miles; with 1000 volts, inside of six miles; with 3000 volts, at about seventeen miles, and with 10,000 volts, at about fifty miles, allowing for transformers.

It is evident from the foregoing principles and figures that the key to long-distance transmission is high voltage.

Electricity and Rifle Practice.

The committee of the Swiss Federal Rifle meeting at Winterthur found that nearly all the shots fired from the right side of the range had hit the target to the right of the bull's eye, while those fired from the left side had, with an equally singular persistency, hit the left half of the target.

An examination of the steel-clad bullets extracted from the targets disclosed the fact that they had become magnetic, and this led the committee to entertain the theory that the phenomenon might have been due to electric influence exerted by the large number of telegraph and telephone wires which run along both sides of the range at Winterthur. Further experiment at the ranges of Thun and Berne proved this theory to be correct. The following account of one of the experiments is given by the *Journal de Geneve:*

"At Thun authorities established parallel with the rifle range, at a distance of a little more than 40 yards, an electric current of 8000 volts, carried along four steel cables. With a view of tracing the whole effect, paper circlets were placed at every ten yards. The first experiments were made with the Swiss model rifle of 1889. With this the influence of the electric current was at once apparent. In a distance of 260 yards the bullet took a lateral deviation of 24 yards, and after that the curve of the trajectory was still more marked. The second experiments were made with the Japanese 3.3 mm. rifle of Col. Yamagata, and they were still more decisive, the bullet being rapidly attracted to the electric wires and following their course with absolute servility. Further attempts were made with artillery. The range selected was one of 3000 yards, and 200 yards in front of the targets, but 40 yards to the side was placed the electric battery. Every shot was diverted by its influence far to the side of the target—to be exact, the deviation was one of 14°.

"The conclusions drawn from these experiments are that a section of infantry exposed to fire at 300 yards would enjoy complete safety if a dynamo or accumulator were placed on its flank; a whole company would be in the same security at 500 yards, and artillery fire could be rendered innocuous at 1000 yards. If these facts are sound, the new small bore rifle is doomed, and we shall have to return to the heavy bullet of lead, because it is unaffected by electricity. But to military reformers this will signify a repulse along the whole line."

Electric Farming.

The agricultural department of the Cornell University recently published the results of some experiments extending over a period of six years, upon the effect of the light of the electric arc lamp upon the growth of plants. It was found as a result of these experiments that there was a decided beneficial influence on the growth of lettuce, and that there can no longer be any doubt as to its advantages in forcing this plant. With seed sown under ordinary conditions and the young plants placed under the influence of the light after they are well established, will show marked improvements up to a distance of forty feet. One curious thing was noticed, that the effect of the shadow of a beam or rafter cast by the electric light showed plainly on the leaves. It is stated in this report that a fancy truck farmer near Boston now uses the electric light in the commercial forcing of lettuce. He has three lamps of 2000-candle power each, which run all night. The hothouse covers nearly one-third of an acre. He finds that he obtains a gain of five days per crop during the winter, which makes a gain of three weeks for the three crops during the winter. The gain from one crop, he estimates, is sufficient to pay the expenses of operating the electric lights during the whole season.

Prof. Bailey states that he finds that many plants grow more rapidly when under the influence of the electric light at night. Among these are the daisy and the violet.

Scientific Progress.

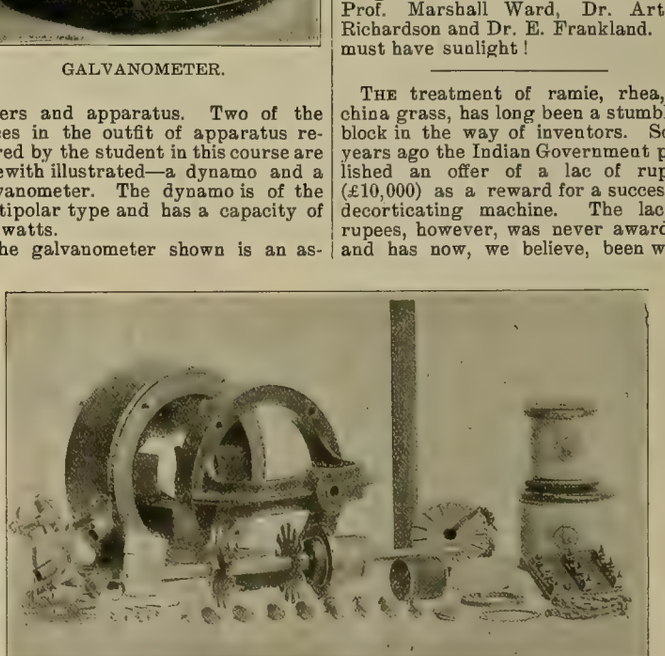
Electricity Taught by Correspondence.

A new method of teaching electrical engineering under the correspondence plan has been adopted by the Institute for Home Study of Engineering of Cleveland, Ohio. The electrical instruction is given in connection with the use of apparatus at the student's home. The Institute supplies the

GALVANOMETER.

papers and apparatus. Two of the pieces in the outfit of apparatus required by the student in this course are herewith illustrated—a dynamo and a galvanometer. The dynamo is of the multipolar type and has a capacity of 250 watts.

The galvanometer shown is an astatic instrument with a resistance in the coils of about one-half ohm, and may be classed as a reflecting galvanometer of low resistance. It is adapted for the detection and measurement of low electro-motive forces and will be found of special use in the measurement of current produced by thermal electric action and by induction in the earth's field. It is especially adapted as a galvanometer for use in testing with a Wheatstone bridge.



DYNAMO USED IN ELECTRICAL INSTRUCTION.

Aluminum Bronze and Its Uses in the Arts.

The aluminum bronzes are the alloys of aluminum and copper, in which the amount of copper considerably exceeds that of the aluminum. Aluminum containing small quantities of copper is not designated as aluminum bronze. Copper containing fron 13 to 90 per cent of aluminum is brittle, and at present has no use in the arts. The useful bronzes are those containing from one to twelve parts of aluminum.

Although aluminum bronze was discovered by the late John Percy almost forty years ago, and its valuable qualities fully appreciated, its use in the arts was retarded by the continued high price of aluminum. It was not until the discovery of cheaper methods of aluminum production that the bronzes received commercial attention.

The value of the aluminum bronzes lies in their non-corrosive properties and great strength. In the former they nearly rival the noble metals; in the latter they surpass iron and compare favorably with steel. The non-corrosive property is not confined to any particular mixture, but characterizes all the alloys. This property is undoubtedly due to the minute film of oxide of aluminum, which is formed on the surface of the metal when exposed to the air. This film is imperceptible, but undoubtedly imparts the quality of resisting corrosion.

In his address as president of the chemistry and engineering section at the recent meeting in Glasgow of the British Institute of Public Health, Prof. William Ramsay explained how the violet rays of sunlight act upon moist organic matter, producing hydrogen peroxide; how this peroxide becomes water, and hands on the remaining portion of oxygen to the organic matter, which it thus destroys or changes. Now, these changes are destructive to the life of minute organisms, such as the bacteria in sewage, and the germs of many, perhaps all, zymotic diseases, such as typhus and anthrax. These are the conclusions to be gathered from the recent work of Prof. Marshall Ward, Dr. Arthur Richardson and Dr. E. Frankland. We must have sunlight!

The treatment of ramie, rhea, or china grass, has long been a stumbling block in the way of inventors. Some years ago the Indian Government published an offer of a lac of rupees (£10,000) as a reward for a successful decorticating machine. The lac of rupees, however, was never awarded, and has now, we believe, been with-

fiber are now confronted with a more formidable obstacle than any they have encountered, and that is the difficulty of getting any adequate supply of the rare fiber at all. There are now ramie works in going order, recently established at Staines, where about three tons of filasse are reported to be turned out every week. But the owners recognize that until something can be done to secure a plentiful supply of the fiber, and at a reasonable price, the ultimate success of the works can hardly be anticipated. They estimate that it will pay the grower handsomely to cultivate ramie at a selling price of £6 per ton, hand-stripped. It cannot be obtained at present under more than double that price.—Industries and Iron.

Mechanical Progress.

ACCUMULATION of waste glass is one of the bores of glass-house managers. A little of the broken or condemned glass can be used again in the batch, but what to do with the piles left is sometimes a hard riddle to solve. Garchey, a Frenchman, has solved this riddle. He grinds the waste glass and puts the powder into a metallic mold which he introduces into two furnaces in succession in order to devitrify the mass. The first furnace serves for the gradual annealing of the mass so that all the parts are devitrified as uniformly as possible. The mold remains about one hour in this furnace. Owing to their pulverized condition, the glass molecules are finely separated and suffer very quickly the devitrifying action of the heat. Becoming soft, the molecules weld together and form a very consistent dough. In this condition the mold is taken out of the furnace and put into the second furnace that is heated up to a very high temperature. In this furnace the mold is left for only a few minutes. This second operation is intended to complete the devitrification and to make the mass more pliable. Then it is ready for being pressed into different shapes. Garchey produces in this manner all kinds of ornamental or other building stone, which is generally called ceramic stone.—American Manufacturer.

A MATTER which is just now engaging considerable attention in the Midlands is the possibility of American pig iron becoming an active competitor in the district, and some merchants are basing their calculations as to lower prices upon the probability of American iron forcing down some of the English brands, says *Machinery* of London. The successful competition of American iron is, however, regarded in well-informed quarters as too dependent upon temporary and special conditions to assume anything like the character of a permanent or established trade. This competition is, however, increasing, American iron being offered against Lincolnshire at 6d under makers' quotations for the above brand, while local merchants are in direct negotiation with American makers for bringing over considerable quantities of iron to this country, one offer which is under consideration, subject to favorable freights, being on the basis of 38s delivered at Liverpool.

OFFICIALS of the Erie Railroad are considering the advisability of establishing the use of horseless carriages in connection with railroad passenger business. The company proposes to arrange matters so that a passenger can telephone the city ticket office, notifying the agent that he wishes to take the train, and a horseless carriage will carry him to the station from his home at the proper time. The maintenance of the vehicles would be practically nothing, and the company's service would be greatly improved. The scheme will probably be experimented with in New York first.

A BICYCLE TIRE has been invented in which feathers are used. It is contended that, when a puncture occurs, the first tendency is for the down to be carried up into the puncture by the pressure of the air on the inside.

Practical Information.

Western Real Estate and Building.

The accompanying table, compiled by the *American Land and Title Register*, shows the total amount of real estate transfers at twenty Western cities for the months of July and August:

	July, '96.	*Aug., '96.*
Chicago	$7,690,000	$6,188,512
St. Louis	4,361,000	4,720,265
San Francisco	757,928	826,298
Pittsburg	922,714	1,265,000
Detroit	1,161,210	1,062,338
Milwaukee	565,800	498 250
Minneapolis	376,700	778,064
Omaha	790,800	698,500
St. Paul	256,687	306,602
Kansas City	1,100,360	1,062,730
Denver	620,000	615,908
Indianapolis	620.000	598,709
Portland	520,000	523,600
Toledo	356,000	375,000
Des Moines	450,000	475,290
Duluth	291,749	317,068
Grand Rapids	400,000	406,300
Seattle	460,000	379,086
Tacoma	262,265	579,734
Los Angeles	1,350,665	1,758,209

The following table shows the total estimated cost of buildings for which permits were issued in thirteen principal Western cities during August of this year and of 1895:

	Aug., '95.	*Aug. '96.*
Chicago	$3,267,000	$1,852,650
Cincinnati	221,777	296,520
St. Louis	2,497,690	2,786,950
Pittsburg	231,314	560,800
Detroit	271,700	786,240
Minneapolis	341,620	267,918
Omaha	42,449	106,850
St. Paul	151,375	69,730
Denver	75,000	120,700
Indianapolis	295,749	276,917
Duluth	69,450	76,850
Kansas City	238,450	276,892
Los Angeles	462,955	296,274

A FRENCH statistician, P. D'Amfreville, has recently made new estimates of the population of the globe and produces the following figures: Asia 825,954,000, Europe 357,379,000, Africa 163,933,000, America 121,713,000, Oceanica and the Polar regions 7,500,400, Australia 3,230,000; a total of 1,479,729,000. In Europe the number of inhabitants to the square mile is 95, in Asia 48, in Africa 15, in America 8, in Oceanica and the Polar regions 3, and in Australia 1. Accordingly, Europe contains for each of its inhabitants 2.8 hectares of land, Asia 5.2 hectares, Africa 17.6 hectares, Oceanica and the Polar regions 84.0 hectares, America 31.12 hectares, Australia 235.6 hectares. [A hectare is equal to 2.741 acres.] The yearly increase of population on the globe is about 5 to every 1000. At this ratio the population of the earth would be doubled every 139 years. In reference to the density of population, Belgium takes the lead with 546 to a square mile, followed by England with 312, Italy with 263, Germany with 237, France with 184, Austro-Hungary with 171, Spain with 90, Russia with 49. The average of all the other countries is 47 to a square mile, and the average for all Europe is 96. In Asia the 826,000,000 are distributed in the following manner: China takes the lead with 350,000,000, British India with 278,000,000, Japan with 40,000,000, East Indian Islands with 39,500,000, French possessions in India with 19,000,000, Corea with 10,500,000, English Burma with 7,500,000, Persia with 7,500,000, Asiatic Russia and Turkestan with 7,500,000, Siberia with 4,500,000, Afghanistan with 4,000,000, Ceylon with 3,000,000, Aribia with 2,500,000, all other parts of Asia with 43,500,000.

New Metals for Coins.

Advices from Washington, D. C., state that experiments with pure nickel and aluminum as substitutes for the present nickel pieces and one and two cent bronze pieces will be made at the mints by order of Director Preston shortly. A resolution was passed by the House of Representatives authorizing such experiments. There is some doubt whether the actual adoption of a new metal for the minor coins will be recommended at an early date by the treasury officials, even if the experiments prove successful. The objection to a change in any form of coins or notes is the disposition of the public to refuse the old forms and insist upon having the new. This would drive into the mints for recoinage $14,000,000 in nickel pieces, which are now in circulation, and $7,500,000 in pennies. The advantage claimed for pure nickel, instead of the alloy now used in five-cent pieces, is its greater hardness, durability and distinctness of impression.

IT is reported that it now seems certain that an electric road will be built between Chicago, St. Paul and Minneapolis, it practically having been decided that the corporation back of the enterprise wll be given a franchise to run in the streets of St. Paul. The matter has been under way for two years, but it was not until a few months ago that the required capital was procured to go ahead with the construction.

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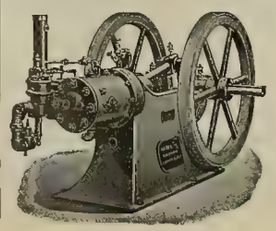

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Coast Industrial Notes.

—The new electric steel car system for Santa Barbara was put in operation last week.

—A meeting of farmers is to be called to consider the question of starting a beet-sugar factory in or near Santa Rosa.

—On Monday the people of Fresno celebrated the opening of the San Francisco & San Joaquin Valley road to traffic from that city.

—The business of the Albany Woolen Mills Company has been placed in the hands of a receiver. The assets are $140,000 and the liabilities $120,000.

—Last Wednesday the single-wheel mill at the Santa Cruz powder works was blown up by the explosion of 200 pounds of fuse powder. No one was injured.

—The growing trade between Puget Sound and Central America has caused the establishment of a second line of steamers between Tacoma and the southern continent. The first line was started a year ago when the steamer Transit was put on by a local company. Now comes the announcement that the British steamer Amarapoora is en route from Hongkong to load a general cargo for La Libertad and other Central American ports, sailing October 25.

—The Manufacturers and Producers' Association has invited the following bodies to participate in a meeting to be held Thursday, October 29th, to devise ways and means of cooperating in the work of the development of the State: Chamber of Commerce, Merchants' Association, Board of Trade, Produce Exchange, Merchants' Exchange Association, Board of Education, Board of Health, Builders' Exchange, State Agricultural Society, State Horticultural Society and State Viticultural Society.

—Maj. Charles Davis of the United States engineers has been in San Diego with surveyors to decide upon locations for four big guns at Ballast Point, for the defense of the harbor. Already $65,000 has been spent at Ballast Point for battery foundations. Possibly these foundations can be used in placing the new guns. Maj. Davis is negotiating for fifty acres of land south of Hotel del Coronado, on which sixteen mortars of twelve-inch caliber will be placed. He will receive bids on October 22 for the continuation of the government jetty on which $40,000 will be spent this year. The Old Town level is also to be repaired. The expenditures for the proposed coast defenses will, it is estimated, amount to several hundred thousand dollars.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPTEMBER 29, 1896.

568,596.—REDUCING ASPHALT—J. W Barnes, S. F.
568,658.—FIRE EXTINGUISHER—J. Buchtel, Portland, Or.
568,659.—SPRAY NOZZLE—J. Buchtel, Portland, Or.
568,563.—CULTIVATOR—J. F. Ebersole, Salem, Or.
568,609.—STOVE DRAFT—T. B. Gilmour. Dayton, Wash.
568,681.—CLEANING WHEAT—Hibberd & Herlitz, Port Costa, Cal.
568,682.—ADHESIVE DEVICE—A. A. Honey, Tacoma, Wash.
567,488.—WAVE MOTOR—Lemon & Bartlett, Los Angeles, Cal.
568,625.—FOLDING CHAIR—H. Owens, Montesano, Wash.
568,701.—LOCK—W. D. Roberts, Portland, Or.
568,460.—SCREW DRIVER—M. H. Schay, Tacoma, Wash.
568,503.—BICYLE SEAT SUPPORT—C. H. Watson, Riverside, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

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Books Received.

"The Mineral Industry for 1895"—Volume 4—has been received. It contains many valuable papers on special subjects connected with mining, besides a large amount of statistics, and will be of value for ready reference. Some of the special papers are as follows: "The Mining Stock Markets;" "Progress in Ore Dressing;" "An Outline of Current Views Upon the Origin of Ores," by J. F. Kemp; "How Deep Can We Mine:" by A. C. Lane; "Force of U. S. Mineral Land Patent," by R. W. Raymond; "Electricity in Mining Work," by T. W. Sprague; "Progress in Electro-Chemistry, Etc.," by Dr. W. Borchers; "Ditch Construction in Idaho," by A. J. Bowie. The book is edited by Richard P. Rothwell and published by the Scientific Publishing Company of New York. Price $5.

THE Department of Geology of the University of California, Prof. Andrew C. Lawson, editor, has issued a bulletin on "Some Pliocene Ostracoda from Near Berkeley," by Frederick Chapman. For sale by the University librarian, Berkeley, Cal. Price 10 cents.

Recent California Mining Incorporations.

Eureka Oil and Mineral Company, Fresno; D. Hattie, R Lochead, J. D. Graig, G. M. Brodrick, R. E. Potter; capital stock, $176,000—all subscribed.

Henry Welch Mining Company, San Francisco; J. H. Jellett, E. A. Selfridge, G. P. and E. H. Rixford, San Francisco, and J. T. Smith, El Dorado county; capital stock, $100,000, of which $60,000 has been subscribed.

The Good Title Mining Company, Nevada City; J. E. Poigndestre, E. J. de Sabla Jr., L. M. Hancock, Nevada City, J. J. Dailey, of Dobbins, Yuba county, and I. Joseph of Cincinnati; capital, $100,000, with $60,000 subscribed.

What Cheer Blue Gravel Mining Company, Oakland; J. M. Williamson, M. C. Rigney, W. H. Lee, E. C. Rigney and G. E. De Golia; capital stock, $100,000, of which $50 has been subscribed.

Ben Franklin Gold Mining Company, Grass Valley, Nevada county; M., M. S. and T. F. White, M. Laudy, P. H. Whelan, A. Burrows; capital stock, $100,000, of which $100 has been subscribed.

Recently Declared Mining Dividends.

The Swansea Mining Company, Utah, $10,000; payable October 10th.

The Mammoth Mining Company, Utah, $20,000; payable October 5th; a total of $1,110,000.

Wasp No. 2, South Dakota, $25,000; payable September 27th.

Iron Mountain, Montana, $5000; payable October 13th.

Morning Star Mining Company, Iowa Hill, California, $4 per share; payable October 5th.

Personal.

L. L. BAILEY of Denver, Colorado, left this city last Thursday on the China steamer for Corea, where he goes to look over the mines.

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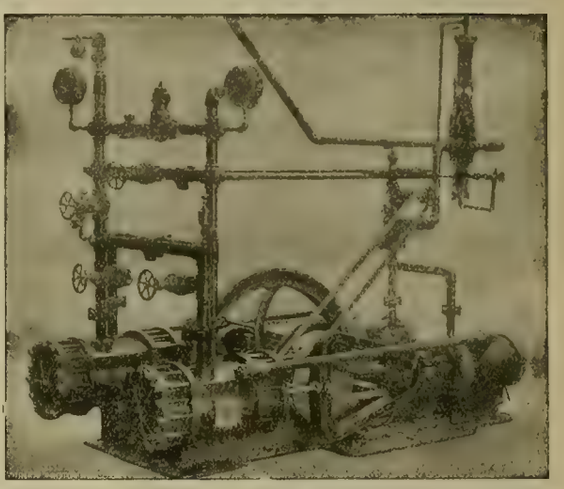

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Mining Summary.

CALIFORNIA.

Amador.

Dispatch: There is some talk of the Lone Hill mine starting up again shortly at Oleta.

An eight-mule team drawing two large wagons loaded with machinery for the electric plant at Big Bar passed through Jackson en route for that place.

Republican: Those who are engaged in gravel mining in this vicinity have met with considerable encouragement of late. The indications for good pay gravel are better than at first supposed, and the outlook for good results from this branch of mining is very good.

Ledger: The double compartment shaft of the Pocahontas mine, near Drytown, is advancing at the rate of a set per day.

A movement is on foot by which it is expected that an English syndicate will take hold of the Pioneer of Plymouth property and sink the shaft 500 feet deeper. Operations are suspended pending the deal.

The work at the Zeila mine has been suspended in order that the shaft may be repaired. It is the intention of the management of the company to sink as soon as the repairs are completed and open out a new stope of 70 feet. When this is worked out it is possible that a new shaft will be sunk.

The Jackson Exploration and Development Company has succeeded to the property of the Jackson Gold Fields. They are to continue sinking on the Amador Queen and intend to go 500 feet deeper as rapidly as possible.

Butte.

Oroville *Mercury*: The Golden Queen mine recently bonded by the Stow company is developing some rich ore. It is free milling gold and the rock will be crushed at the Gold Bank mill, Forbestown.

Another strike is reported in the Denver mine at Forbestown, with plenty of ore in sight.

All the mines with the exception of the Old Flag are running with full force at Brown's Valley, and the Flag has only suspended operations for the present for the purpose of effecting a reorganization. This is about accomplished, and in a few days it is expected that work will be resumed. The Webb company are crushing rock from the Dannebroge and are also engaged in erecting hoisting works on the old Pennsylvania, preparatory to pumping and cleaning out the mine.

Calaveras.

Citizen: A large boiler for the Ford mine has been hauled from Valley Spring.

San Francisco people are operating the Sand Hill gravel mine at Camanche. A greater depth has been reached on the channel than ever before, showing 35 feet of pay gravel and the bedrock is not yet in sight.

The 10-stamp mill at the Fellowcraft is in readiness to begin crushing ore and the stamps will commence dropping the first of next week.

Thirty men are at work on the Melones mine, near Carson. The mine is under the management of W. C. Ralston.

The Gunter gravel claim at Washington Ranch has been bonded to Oakland capitalists and operations will commence immediately. This property embraces eighty acres of what was considered in early days the richest gravel channel in this part of the county, and, with the advantage of modern machinery, can be worked with great profit.

El Dorado.

(Special Correspondence).—J. V. Selby of San Francisco has bonded eighty acres of the Larkin ranch and the beginning of development work is already inaugurated. Mr. Selby was largely instrumental in starting the present organization of the Larkin Mining Company (incorporated), which after expending $20,000 has proven a good mining property.

R. M. Mooer has sold eleven claims, grouped under the name of Alhambra, to V. Hauser and H. E. Averill of San Francisco. Work has been started to pump the old shaft and push explorations upon the old drifts. This property was not worked below 100 feet and some drifting, and was fabulously rich, as proven by Banker Alderson's book records. The claims are about ten miles from Placerville, to the north, in the Kelsey district.

The Eagle King 10-stamp mill, one mile from Grizzly Flats, has started its machinery. W. Murdock, the superintendent of this property, together with Mr. Dyer, has an invention for a self feeder that is in use in this mill, a patent on which is applied for.

Placerville, Oct. 6, '96.

Inyo.

Independent: The silver and lead mining interests of Cerro Gordo, Darwin and Modock are practically at a standstill; all ore teams have been hauled off, shipments suspended and business generally is at a lower ebb than for many years past. Farther out, however, in the gold districts, there is considerable stir, indicating future activity.

Geo. Lewis has a working bond on the Wilson & Wibbelt property, near Mountain Springs canyon.

Across Panamint valley, in the Telescope mountains, the miners centering about Pleasant canyon have organized a new mining district under the name of South Park.

The late run of the Golden West mill, on ore from the Anthony mines, is reported to have resulted in a cleanup of about $7000.

Register: L. Chiatovich has begun to enlarge his cyanide plant near Gold mountain. Cyanide has done much for that section and it will do far more in the future. The company (L. J. Hanchett & Co.) has struck a large body of good milling ore in the bottom of the main incline at the Western Soldier mine. There is a great quantity of low-grade ore in sight in the Silver Peak district.

Kern.

Californian: The Rand Mining Company have let a contract, it is reported, for the erection of their 40-stamp mill inside of sixty days. It will be located about midway between Randsburg and Goler.

Both stamp mills at Garlock are working. A four days' run of one mill crushed forty-three tons of Randsburg ore that went $45 per ton.

Another strike has been made at Randsburg northeast of Mt. Olympus, on the Richardson claim.

A strike is reported from the mountains back of Kœhn springs, and sixteen locations have been made thereon. It is a succession of huge gold-bearing ledges that assay also in copper and silver. The ore is clearly a smelting proposition, and will have to be shipped until concentrators are put in at Kœhn springs.

Mariposa.

(Special Correspondence).—The absorbing news of the week is the well-authenticated report that the Mariposa grant has been definitely offered to the Exploration Company, Limited, of London. This is the corporation that fathered the South African gold fields, the Coolgardie mines of West Australia and the great dividend paying properties of Charters Towers in Queensland and introduced them to the British investing public. Senator John P. Jones is now on his way from the East to meet Hamilton Smith, the English expert, at San Francisco and escort him over the grant. During the past year many mining experts have visited the Grant and made reports, but it is reserved for Hamilton Smith, the highest salaried official of the Exploration Company, to make the final report. The Las Maripozas grant comprises about 44,000 acres on the direct line of the mother lode, and right in the heart of the mineral belt. The title to the property is derived under an old Spanish grant, which was acquired by Colonel Fremont for a song. After floating around the plains in the San Joaquin, Colonel Fremont finally located his grant in the Sierras and cast anchor at Bear valley. After spasmodic speculation, during which, as a sort of variety show, many actors made their bow, the grant settled down to a policy of masterly inactivity. The Princeton, Mt. Ophir, Pine Tree, Josephine and numerous other mines were all shut down—shut down at a time when they were paying well, because stock speculation in New York had collapsed. The greatest depth attained was at Princeton, and that was only a trifle over 600 feet. Between Mt. Ophir and Bear valley, some six miles of the mother lode, there has not been a pick stuck in the ground. If the London Exploration Company takes hold of the property, it is probable that it will make another Witwatersrand of it. The officials of the Exploration Company are nearly all Californians, and, after trying their wings in foreign climes and acquiring experience, they are getting down to the fact that their native State, along the mother lode, offers greater attractions to the gold seeker than anything that can be found outside of it.

The directors of the Merced Gold Mining Company have finished their inspection of the company's mines and gone back to Boston. They appear to be satisfied with their prospects and will submit a report to their shareholders recommending a policy of continuous development. The Merced Company have a capital of 100,000 shares of $15 each, $3 per share being still uncalled up. Recently a call of $2 per share was made, and the company has now about $200,000 at its disposal in the treasury. With this money the report of the directors will advise the shareholders to construct an electrical power system from the Tuolumne river. The power plant will be near Priest's hotel, below Big Oak flat, and about 11 miles from Coulterville. Another 60-head of stamps will be put up and the mill at the Potosi tunnel will be removed to Maxwell's creek, some distance below the Louisa mine. Captain Thomas Couch will re-assume the general management of the Merced Company's affairs.

At the Tendron mine, in the Whitlocks district, the Sierra Buttes Co., Limited, owners, the 20-stamp mill is running steadily. It is reported that the company has struck a shoot of rich ore.

Goodall, Perkins & Co. have a crew of men working at the lower end of Hunter's valley on the old Barretta mines. The proposition is a large one, so that it will take extensive tunneling to develop.

Charles E. Stuart, at the Doss mine, two miles from Hornitos, is now down about 850 feet. He is at present in San Francisco looking after more machinery.

The Mose L. Rodgers group of mines—the Washington, No. 9, Pool and Quartz Mountain—are preparing to start up.

In connection with the rumored sale of the Mariposa grant, several parties have recently been looking at the Yellowstone mine at Bear valley.

James J. Dolan has started work on the Story mine at the head of Indian creek near Date's Flat, at the top end of Gentry's gulch. The main shaft at the Story is down about 100 feet, and there is a tunnel and crosscut connecting with the bottom of it. Mr. Dolan, who was for years superintendent of the Mariposa grant, is sinking another 100 feet, and appears satisfied with the prospect.

J. B. Irving of Carlisle, England, has been inspecting the Farmer's Hope mine, Grove and Allingham owners, about seven miles from Mariposa. Mr. Irving has returned to San Francisco, taking samples with him.

A crew of men are at work on the aqueduct of the Mariposa Electric Power Co.

Capt. A. H. Ward is now at the Penon Blanco mine. He is still driving the tunnel from the west side to intersect the main lode.

The 5-stamp mill at the Laura La Grande, Macfarlane and Duncan owners, at Hazel Green, is working on $50 rock. Another five head of stamps has been ordered, and extensive exploration work is being done.

Dr. E. S. O'Brien of Merced recently visited his Mabel & Ethel mine on Saxon's creek, where development work is going on, and has gone to San Francisco to order additional machinery.

Coulterville, Oct. 6, '96.

Gazette: J. D. Ludwig has finished crushing Mariposa quartz. He has been using the mill at the Yellowstone mine. He reports that samples of the quartz went two ounces to the ton. Under his management they have just completed retimbering the Josephine mine.

It has been reported that the Yellowstone mine at Bear Valley has been bonded and work will be commenced very soon.

Mining seems to be looking up around Hornitos. They are now pumping out the No. 9.

There are twelve men working at the Dorse and reports are encouraging.

Miner: The Denver mine, near Haywards, owned by S. H. Haywards and James S. Johnson, is being examined by experts in the interest of an English company. There is about 200 feet of tunneling along a very large, well defined ledge said to carry $3·76 in gold.

Nevada.

Union: Some excellent ore has been taken out of the Pennsylvania mine. It came from the 600 level and was too rich to go through the mill.

A company represented by Charles Stepp has about completed arrangements for bonding the Mountain Chief mine in Willow valley. From present prospects it is expected that work will be begun at the mine in about six weeks. The property adjoins the Texas mine and there is a network of ledges on the property, all of which are supposed to lead into the main ledge. The shaft is about 110 feet in depth and there is a small hoisting plant on the mine.

Tidings: Captain D. S. Donohoe has erected a 2-stamp mill on his mine in the Washington district.

The Omega dam is to be rebuilt.

Transcript: The full complement of forty stamps in the mill at the Providence mine were started up last Monday and the full force of miners are at work again. The mill has been thoroughly overhauled and will be kept running at its full capacity, there being an abundance of good ore in sight.

The Champion Company are preparing to begin work in the old Merrifield mine, which property they now own.

Operations have been resumed at the upper hoisting works of the Reward mine. The lower hoisting works, which were put up to facilitate driving the drain tunnel, are still being operated.

Placer.

Colfax *Sentinel*: The Mayflower Company have made an upraise into what they believe to be an extension of the old Paragon lead.

O. J. Spencer of Iowa Hill has sold the Big Gun mine at Michigan Bluff, which includes the Van Eman and Red Hill patents. The parties making the purchase are J. and E. Powell, G. Hill, N. Huff, W. Locey and E. S. Thompson.

A vein of quartz 2 feet in thickness and bearing free gold in considerable quantities has recently been discovered in the Sailor gravel mine at Sailor canyon. The company have commenced an exploring tuunel to develop the ledge. The work of exploring the channel or old river bed is progressing steadily. At present the main gangway is being driven ahead and is in about 1700 feet.

Bids are asked for raising the Liberty Hill dam across Bear river, near Dutch Flat. When the work is commenced the Liberty Hill and Polar Star hydraulic claims will be operated.

Some very good gravel has been taken from the Breece & Wheeler mine at Bath. There are 14 men at work.

Plumas.

Plumas *Independent*: Work has been resumed on the prospect shaft of the Verdi placer claim on Mill creek.

Shasta.

Free Press: A company of English capitalists, who have been operating in Mexico, have made extensive repairs to the Afterthought mill, near Furnaceville, and have put in a smelter of thirty tons capacity. One thousand tons of ore have been taken from the Donkey mine, and a contract to haul the ore to the smelter has been awarded.

The Integral Quicksilver Mining Company have put a large force of men to work cleaning up and further developing their property.

The Altoona mine is being run at its fullest capacity. About 650 flasks of quicksilver, valued at $26,000, are produced monthly. The company gives employment to over 350 men, 65 of that number being underground miners.

The success of the smelting plant of the Mountain Mines, Ltd., at Keswick, has stimulated the mine owners of Old Diggings to greater activity, as great quantities of ore will be required as flux for the smelter.

The Garfield mine has a force of eight men employed in development work.

The Hart mine and mill are being run to their full capacity.

A large force of men are employed in getting out ore at the old Central mine.

Sierra.

Messenger: The Jamison Mining Company are pushing work on their mill. Quite a supply of good ore is out and the showing in the mine is said to be good.

The Four Hills mine will soon begin crushing ore. Already 400 tons of good ore are ready for milling.

No. 9 mill is being repaired and will soon be in readiness to crush ore from the Bigelow mine. Quite a force of men are employed, and it is reported that rich rock has been struck.

Last week $15-ore was struck in the American Exchange mine, in Hog canyon. The ledge is 12 feet wide.

Siskiyou.

Yreka *Journal*: The owners of the Shinar mine, Leadville people, have contracted for hauling freight from Yreka to the mine, including 80,000 pounds of pipe and two cables weighing each 34,000 pounds, for use at their new mine. The ditch which they have been building is about completed, and this pipe will be used to carry the water across the Klamath river, and will be suspended by the large cables. This will be one of the most extensive plants in the northern part of the State when in operation.

A number of quartz ledges in Quartz valley and in the vicinity of Oro Fino have been in operation this summer, and most of them have been paying very well. Together with the extensive hydraulic mines which run a greater part of the year, that is one of the most successful mining localities in the county.

Reporter: Shorbs, Brunt & Co. are again taking pay gravel from their drift mine below French Bar.

Martin Andrews and son are working their drift mine underneath the bar, on which stood Simonville, a flourishing town, in early days, but no trace of which is now visible to the passing stranger.

The Chinese company on Michigan bar have before them a large body of ground. This is, perhaps, the most valuable mine on Scott river to-day.

Yreka *Journal*: The Mabel mill, near Scott Bar, will be started up soon and the owners will begin crushing ore from the Mabel mine immediately. They have over 200 tons of rock out. The last crushing went over $20 a ton.

The ditch which the new mining company on Thompson creek is building will be one of the best ditches ever built in the county. It is giving employment to about fifty men.

Tuolumne.

Union-Democrat: The pocket miners, who find their busiest time during the winter months, are already beginning to arrange for starting work on the hundreds of prospects that have been more or less idle for some time.

The usual rumor that Whiskey Hill will be started is again being actively circulated.

At the Dutch the new hoist is completed. Preparations are being made to add the 10 new stamps to the mill.

Over 75 men are employed on the Shawmut and Eagle mine. Two new shafts have been started; the one on the Shawmut end is down 125 feet and the one on the Eagle end only started last week. The intention is to sink them 1000 feet.

At the Confidence, preparations to build the new 30-stamp mill are well under way. It will be run by electricity, which will be generated but a short distance from the mine.

At the Alabama the shaft is down 107 feet. When it reaches a few feet more a station will be cut on the 100, and levels driven north and south on the ledge. During the winter the work of sinking will be continued and stations cut every 100 feet. The intention is to have the property opened up by the early summer of 1897 so that the Londoners interested will be able to judge for themselves the value of the claim and the scale upon which they wish to work it.

James Gloster, an old Montana prospector, recently discovered a valuable ledge of high-grade ore near the old Buchanan mine. He has already refused an offer of $20,000 for a one-half interest. He claims to have eleven feet of ore that will average $15 per ton, which in this section is an extravagant claim, though the abandoned Buchanan mine in that immediate locality was a bonanza producer. The new find is the theme of general conversation.

At the Arbona mine, owned by the Equitable Mining & Milling Co. of Stockton, the crosscut tunnel will soon be completed, after which drifting each way along the ledge will be done for the purpose of ascertaining the length of ore chutes. There is a large amount of ore in the ledge showing along the surface for a distance of more than 500 feet.

During the week seven men were laid off at the Mammoth mine. There is a feeling of uncertainty existing as to the future operations of the company.

The cleanup at the Jumper mine is increasing each month in value. The amount of bullion being produced monthly now is from $150,000 to $200,000. The ore continues to hold out both in richness and quantity.

Independent: W. H. Storms who has long been connected with the State Mining Bureau is to open up the Junction mine shortly. The Junction mine is an extension of the Live Oak and is capitalized for $100,000. Mr. Storms will be the superintendent. His associates are Chas. G. Yale, H. S. Durden, W. A. Hall and R. S. Clark.

NEVADA.

The citizens of State Line district are awakening to a new era, owing to the big strike in the new tunnel that is being run under the old mines near Austin. The projectors of the tunnel have struck ore that gives 1000 ounces in silver to the ton. A 20-stamp mill is being built to work the ore. The ore is of a rebellious character and will be hard to work, but the management expect to extract nearly all of the silver.

The Keystone Mining Company, near McClosky creek, have built a new bridge over the creek and a wagon road to the mine. Machinery for the new mill is arriving, and the company expect to have the new plant, which will be of ten stamps, in running order before snow flies. The company have about 16 men employed at present.

Winnemucca *Silver State*: The Bray brothers of Austin, Nevada, are putting up a mill in Ione district, where they own a gold mine.

OREGON.

Democratic Times: Hale Bros. & Co. of Leland are constructing a seventeen-mile ditch

to their Grave creek placer mines, and will operate on a large scale this season.

Alex. Watts is building a five-mile ditch from Munger gulch to his Horsehead diggings in Williams creek district.

C. L. Mangum and his associates are prospecting a large bar in the western part of the county. They claim 57 feet of pay gravel which will average from 25 to 40 cents per cubic foot.

Favorable reports continue to come in from the Oregon Bonanza mine in Williams creek district.

J. A. Leonard, H. A. Stevens and others have located several claims on a ledge of free-milling quartz which they recently discovered on Soldier creek, Josephine county.

The Hampton-Lewis Mining Co. of Grave creek have thirty-five men employed digging ditches and repairing flumes.

C. E. Phillips and Walter Strong will put an extensive hydraulic plant in Allen gulch, Althouse district, and rebuild the Darkas & Quinn ditch to supply water.

It is announced that the Squaw Lake Mining Company, which is now cleaning up, will temporarily suspend operations after this week.

O. G. Shurtleff and Ed. Sikes of Portland, who with B. A. Haney and H. H. McCarthy bonded the Blatt ledge on Flarmer's Flat, have completed nearly 100 feet of tunnel.

WASHINGTON.

Spokesman-Review: Arrangements have been completed to commence work on the property of the Comstock Mining and Smelting Company in the Le Fleur district.

In Okanogan county a company was formed some time ago, with a capital of $5,000,000, to tunnel Palmer mountain and it has begun work. The tunnel begins on the first bench back of the town of Loomiston. It is proposed to run it 3000 feet to begin with, which will give a depth of 1100 feet in the face and take the tunnel half way to the Grand Summit mine. There are twelve other known veins on the line of the tunnel, all of which carry free-milling gold ore, some of it being very high grade. When the tunnel is completed to the 3000-foot station it will be within a few feet of the east end line of the Black Bear and War Eagle mines, which have already produced over $100,000. These two mines are the only properties on the line of the tunnel which the tunnel company does not own or control.

BRITISH COLUMBIA.

Spokesman-Review: The Idaho mines in the Slocan have declared a dividend of $20,000 and expect to declare regular dividends of from $15,000 to $20,000 a month from this on. This company has paid over $60,000 in dividends in the past. Ore to the value of $35,000 was taken from the mine last month. The concentrator is handling 350 tons of ore a month, the concentrates of which will run 200 ounces in silver and 45 per cent in lead. The crude ore, of which 50 tons are taken out monthly, will run from 250 to 320 ounces in silver and from 50 to 65 per cent lead.

An important strike has recently been made on the Bluebird mine, in the Slocan. The strike is on a new vein, which is from two to four feet wide, and assays from the ore run as high as 270 ounces in silver and 50 per cent lead.

J. L. Drumheller has sold his Rabbit Paw claim, in the Slocan, to F. T. Kelly, one of the owners of the Reco, for $5000.

The new strike of free gold on the Maud S., in the Waterloo camp, continues to be the absorbing topic on the streets.

The Evening Star is now making daily shipments of 20 tons of ore to the Trail smelter.

A new discovery has recently been made on Observation mountain on the Gold Nugget claim, near Grand Forks. The formation is rose quartz in granite, the assays of ore from a depth of six feet running well in gold. The ledge is over 40 feet wide and lies between well-defined walls of granite.

An agreement was recently made between Robert Clark, owner of the Seattle mine, and Charles Hay and Neil McCallum of Grand Forks whereby it was agreed to stock the property for $6,000,000.

Another strike has been made in the Evening Star mine near Rossland. The strike was made in the lower tunnel, and uncovered a body of four feet of ore.

Rossland *Miner*: Charles Bates and partners have sold the Little Giant group to a Seattle syndicate represented by Captain O'Toole for $10,000 on a six months' bond.

An option has been taken on the Surprise by a French syndicate for $50,000. It lies up on the east side of Red mountain, comprising about 45 acres, adjoining the St. Louis.

The Reco group, consisting of the Reco, Texas, New Denver, Clifton and Ephraim, has been incorporated under the provincial laws with a capital of $1,000,000 in $1 shares.

Spokane *Chronicle*: Several properties on Stoney creek, two miles north of Rossland, are being developed, and the work discloses heavy ledges of ore similar in character to those on Red mountain and Monte Cristo.

Baltimore and New York capitalists have purchased the Carbonate King group of four claims, lying near the No. 1 mine at Ainsworth. Development work on this property will begin immediately and continue all winter. They are understood to be figuring on the properties.

The Evening Star mine at Rossland has begun to ship ore, and hereafter about twenty tons per day will be sent to the Trail smelter. The ore is averaging over $40 per ton, and shipments will be increased as rapidly as possible.

The Gopher, in the south belt, has been bonded to an English syndicate for $50,000.

ALASKA.

News: Over 200 new mining claims have been filed for record in Harris mining district since the first of the year.

The Julian Mining Company have made their first cleanup and the management is more than gratified at their success.

UTAH.

Salt Lake *Tribune*: The Grass Creek Coal Company has incorporated with a capital of $200,000. The company owns the Cullen Springs coal mine and appurtenances, together with 500 acres of coal lands in Summit county.

The Sacramento has started up its mill with ten new tanks and a capacity for handling 100 tons daily.

The State Line Gold Mining Company has incorporated with a capital of $200,000. The company owns a group of claims in the State Line mining district in Iron county.

The shaft on the Wonder has now reached a depth of nearly 450 feet.

S. D. Colton & Co., who have been working the Big Four copper mine, near the Dyer of Victoria, have put out over 100 tons of copper.

The fact that Silver King is now marketing its ores at the rate of about 500 tons a week, and this in the face of a recent announcement that no more dividends would be posted until there was an advance in the metal market, has excited considerable speculation among local brokers, a majority of whom express the belief that dividends will be renewed in November, if not the present month.

The Mercur Company broke all previous records during the month of September. With a force of 115 men Superintendent Edwards mined 7000 tons of ore; and the mill, being constantly supplied with the exception of a few hours, also broke its record and treated the entire amount, which would be an average of about 235 tons daily.

It is reported that a contract has been let by the Bullion-Beck Tunnel Company for driving their Mammoth tunnel 400 feet farther into the mountain.

At Tintic L. E. Riter and C. E. Loose have taken up their bond on the Elmer Ray and will shortly commence vigorous development of the property. They have been engaged for the past month in clearing up the old workings and have the property in good shape.

Although the backers of the project decline to release particulars at this time, it is well known that the plans for the big tunnel that is to tap the mines at Alta have about crystallized, and that work will probably be begun in a very few weeks. As previously announced, the plan is to make the tunnel serve a double purpose. In the first place no attempt has ever been made to explore ground below the water level at Alta, in that it involved the use of heavy pumping machinery, while a drain tunnel will overcome this and throw the ground open to economical development. Again, a tunnel such as is projected will afford a permanent outlet at all times of the year for the ores of that camp, whereas the season in which ores may be handled at present is six months at the most.

A letter received by the officers of the company brings tidings of a new strike in the Four Aces at Silver City.

Tribune: The Mammoth mine is now lighted entirely with electricity that is generated across the gulch, and in the mill.

The management of the Hoogley at Bingham is making arrangements for a gasoline plant on that property.

The New Hawkeye Mining Company has incorporated with a capital of $100,000 to work a group of five claims in Wasatch county.

At Silver City the Swansea ore body has continued to improve in quality as well as quantity.

The Gold Point Mining Company has decided to resume work, and to that end a contract has been let for 100 feet of drifting upon the dip of the vein. The group of claims embraced in the company's possessions are located in Ferguson gulch, off Big Cottonwood. Upon the property the shaft has already been put to a depth of 75 feet, at which point the vein is 38 feet between walls.

IDAHO.

On the "island" east of Market lake placer mining is being done. In mining, the soil is scraped off, and then the gravel is washed in the old-fashioned rocker, in which burlaps are placed to catch the fine gold. Some 40 to 60 men are engaged in this class of mining, and they estimate the average earning per day at about $2 for each man.

Recent rich strikes in the Florence mining district are causing much excitement in mining circles.

Avalanche: At the Trade Dollar a complete electric light and power plant will be put in at once. The output for September will be about $115,000.

A rich strike has been made in the Poorman, in a crosscut from the lower tunnel.

MONTANA.

Mining and Railway Review: A. L. Tanner has struck a rich tract of placer ground a few miles from Red Lodge. A single pan of gravel from his diggings is said to have yielded as high as $5.

A 20-ton smelter is to be erected at Princeton. Preparations for the work are already under way. Water power for the operation of the plant is to be secured from the Big Spring.

Inter-Mountain: H. L. Frank and E. L. Whitmore have secured the Gem and a fraction known as the Stuart, north of the High Ore, on a bond of $45,000, and are now putting machinery in position to work the ground.

The Mat mine, in Meaderville, which has been lost sight of for a number of years as a producer of copper, is now being prospected. Lately the shaft has been developed an additional 200 feet, making its total depth 400. Regular shipments of copper-silver ore are being made, but not in large quantities.

The Pauper's Dream Mining Company, above Rimini, will resume operations after a shutdown of many months. Since the mine and mill closed down the company have expended considerable money in improving the one and developing the other.

The second payment of $100,000 has been made on the purchase price of the Diamond Hill mine, recently sold to Glasgow, Scotland, capitalists. The purchase price is $2,000,000, more than half of which is to be paid in cash, the balance in stock in the new company. The company will at once begin the erection of a 60-ton mill, which will cost about $200,000.

During the past week a number of experts have visited the Minnie Healy, near Meaderville, and made an examination of the workings. It was reported that the Colorado company had secured an option on it for $150,000, but this is denied.

The Ruby Placer Mining Company, operating on Wisconsin creek, have about completed their extensive scheme of development, which consists of a bed-rock flume one-half mile in length, a substantial reservoir, several miles of ditch, a system of electric lights, etc.

Report is current that a new 4-foot chute of $40 ore has been exposed in the Leiter.

Work on the Old Faithful mine at Bannack, in which a rich gold strike was made some weeks ago, has been suspended temporarily owing to a misunderstanding between the company and the miners. The mill is running regularly and, it is said, with very satisfactory results. A few weeks ago a cyanide electric plant was installed.

The reports received from the Beef Straight and Homestake districts are very encouraging. W. Huselton, who bonded the Black Sheep to W. A. Clark of Butte for $26,000, says that the Black Sheep is looking better now than at any time in its history. It is the deepest mine in the district, the ledge being tapped by an 800-foot tunnel 250 feet from the surface.

SOUTH DAKOTA.

Black Hills *Miner*: Another discovery of high-grade gold ore has been made on the Union Hill property in Galena camp, that assays nearly $100 per ton.

A shoot of siliceous ore has been uncovered in the 100-foot tunnel on the Hudson group of claims.

The Lead *Call* reports that an ore shoot 4 feet thick, assaying $80 gold per ton, was recently encountered in the workings the of Durango mine, on the Poorman divide.

A shoot of siliceous ore has been encountered in the workings on the Granger group north of Portland.

The main tunnel on the Deadbroke group on Blacktail gulch, is now in over 1500 feet, the last 200 feet having been driven under the ore body.

Another discovery of high-grade siliceous ore has been made in Ragged Top camp, on the Norwich lode. As the same vein is opened to the southeast, on the Dacey ground, its course and continuity are now proven.

The new ore shoot recently encountered in extending the main tunnel, now in about 500 feet, is proving to be one of the largest yet found on the Poorman divide. It is fully 7 feet thick and has been drifted into for 14 feet and is solid clean ore.

The report of the secretary of the Wasp No. 2 shows that 22 carloads of ore were shipped to the Kansas City smelter during the month of August, the gross returns from which amounted to $32,504, an average of $1482 per car. All of this ore was taken out in running a drift 70 feet long and 10 feet wide in the ore body.

A large body of silver-lead ore of an average value of $16 per ton is exposed in the workings in the Joe Hooker lode, owned by the Yankee Boy Mining Company, in Carbonate camp. The face of the workings show a solid breast of ore 5 feet thick and 13 feet wide, resting on quartzite.

Black Hills *Times*: The Keystone Mining Company will soon put in the machinery for the new cyanide plant, intended to treat the concentrates from the stamp mill.

During the past few weeks the vein in the St. Elmo has rapidly increased in size, and is now fully 7 feet in width at a depth of 45 feet.

The lessees of the Iowa and Brunette lodes, situated at the head of Poorman gulch, have encountered a body of high-grade cement ore in the old workings that shows considerable free gold.

WYOMING.

Edward A. Green has completed arrangements for the purchase of a large placer mine near Lewiston, Fremont county. The purchase price is said to be $90,000. Mr. Green bought the property for Eastern capitalists.

Reports from Grand Encampment are very encouraging as development progresses.

Chicago investors, who several months ago gave a bond of $12,000 on the Virginius mine in the Keystone district, near Rawlins, made the first payment of $4000 on the property on October 1st, having decided that the mine is a paying proposition.

The machinery for a complete cyanide plant to be placed at the Kelly creek mines, five miles from Buffalo, is being freighted in. The ore averages $3 a ton and the plant will work about 120 tons a day.

COLORADO.

Cripple Creek *Mail*: A big ore house is being erected near the mouth of the shaft of the Granite mine on Battle mountain.

The Rhyolite Mining and Milling Co., which owns three claims on the south side of Little Bull, have resumed operations on their property with a full force.

The Putman brothers have sold their Pointer mine on the southwest spur of Gold Hill to an Illinois syndicate for $40,000.

Estimates place the output at present of the district not far from 600 tons daily, the average value of which is $60 a ton. From the present indications the output for this year will exceed last by $1,000,000 or more.

The sensational strike made on Buck mountain in the Veritas is described as nothing less than a 4-foot vein which is all ore running from $300 to $400 per ton and carrying a 4-inch streak of sylvanite.

The Anchoria-Leland company will ship a greater tonnage this month than any month in the history of the mine. The output last month exceeded in gross value $45,000.

Shipments at the rate of 25 tons a day are being made from the Ironclad. The output figured $38,000.

The production from the Independence mine for the month of September is now placed at 800 tons. The ore is going to the smelters and the value is roughly estimated at $100 per ton. The Peck mill has been started up.

The Gold Coin Company has lifted the bond of $55,000 due the Mount Rosa Company for the Gold Coin mine, which has been developed in the past few months into one of the best producers in the district. The bond was not due until October 14.

A bond and lease has been executed by the Squaw Mountain Mining and Tunnel Company to R. M. Maloney, Lyman White and associates, the lease being for two years and the bond calling for $200,000.

ARIZONA.

At the Congress mine, Arizona, the shaft is now down 1800 feet, and four miles of tunnels, drifts and other underground work have been run. About 355 men are employed, and the output of the mine is said to be about $80,000 per month.

Globe *Silver Belt*: The Cliff mine, which adjoins the Dime and is bonded as a copper claim to the United Globe mines, bids fair to become a silver producer, for which it was originally located.

The result of tailings treated at Harqua Hala for the month of August is: 4197 tons; bullion yielded, $11,812; expense on revenue account, $6,550; profit for month, $5,262.

Yuma *Sentinel*: Dr. Jayne writes under date of Sept. 20th, from New York. "Senator Dorsey and associates have purchased my group of mines, the Mars, Venus, St. George and Goshen, at Picacho for $250,000."

The Golden Dream Mining Co. is crowding the work with 25 men on its six shafts and two tunnels with excellent results. There has been a steady improvement on the quantity and quality of the ore bodies.

The Golden Dream Co.'s mill will be ready to ship on the 8th. The company will crowd the work on its other mines as fast as men and money can do it. It has already given orders to have the work pushed.

Adolfo Sambrano has struck ore rich in free gold, visible to the eye.

Villa Bros. have struck it rich in their tunnel on the Golden D. K. mine, taking out the richest ore ever found at Picacho. This vein has been crosscut for 54 feet with neither wall in sight. This tunnel and the Sambrano shaft are both about within 1,000 feet from the Golden Dream mill.

Mining News: At Harshaw, Richard Farrell has 40 men employed on the Old Trench. Sometime ago, in the process of development, a lake of sulphuric acid was encountered. Tools were eaten up and quite a loss occurred through the discovery of the unexpected deposit. The acid was finally pumped out, however, and work continued.

AUSTRALIA.

Mining Standard: The following is an analysis of the results of the Croydon Quartz Crushing and Gold Mining Company's cyanide operations. It shows the cost of treating low-grade tailings at the largest works of the kind yet run in Australia:

Duration of run (working days)	469 days
Corrected dry weight of tailings leached	37,387 tons
Weight of tailings leached per day	79.7 tons
Percentage of acid in ore	0.24
Water to remove acid per ton of ore	174 gallons
Average leaching rate (water and solution) per hour	0.93 inches
Weight of bullion recovered	36,731.1 ounces
Weight of fine gold recovered	8 21 2 ounces
Weight of fine silver recovered	26,700.6 ounces
Cyanide consumed per ounce of bullion recovered	9 pounds
Zinc consumed per ounce of bullion recovered	0.36 pounds
Strength of cyanide solution	0.2 per cent
Percentage of tailings	0.08 per cent

	Gold. Dwts.	*Silver. Dwts.*
Assay of tailings before treatment, per ton	6.45	30.45
Assay of tailings after treatment, per ton	1.49	16.41
Extraction called for per ton	4.96	14.04
Recovery, per ton	4.41	14.31
Recovery, per cent	68.3	46.9
Average fineness of bullion	.2243	.7275
	£ *s. d.*	*s. d.*
Average value of bullion, per ounce	0 19 0 65	1 2.64
Assay value of tailings per ton	1 7 4.77	2 7.97
Recovered value of tailings per ton	0 18 9.01	1 2.58

COST OF TREATMENT.

	Cost.				Pounds per ton.	Cost per ton.	
	lbs.	£	*s.*	*d.*		*s.*	*d.*
Cyanide	36,405	3821	10	5	0.97	2	0.53
Zinc	9,720	398	4	5	0.26	0	1.98
Caustic Soda	30,106	245	16	4	0.80	0	1.57
Chemicals		351	14	0		0	2.25
Firewood (387¼ cords)		503	8	0		0	3.23
Water		456	15	6		0	2.93
Miscellaneous Stores, etc		203	8	6		0	1.30
Laboratory Salaries		768	15	2		0	4.93
Management		740	0	0		0	4.75
Filling and Discharging Vats		3096	0	0		1	7.87
Other Labor		1044	15	5		0	6.71
Royalty		2891	4	0		1	6.36
Bank Charges		3085	1	8		1	7.67

Total cost, £17,466 14s 1d; total cost per ton, 9s 4 11d.

Mill process employed; stamping over copper plates and grinding the blanketings in wheelers and berdans.

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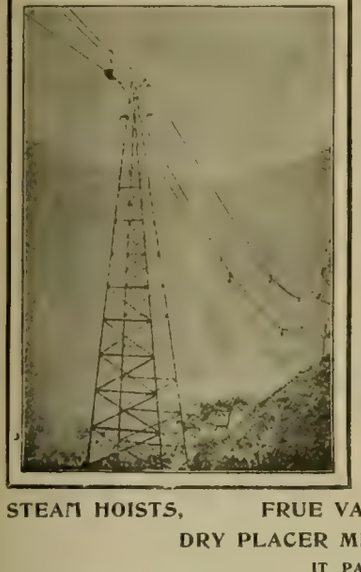

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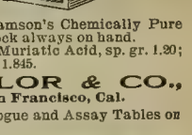

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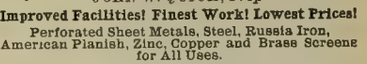

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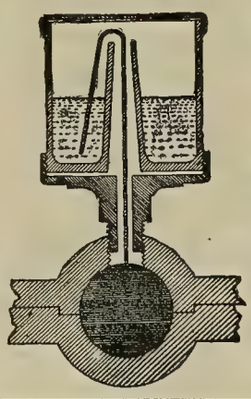
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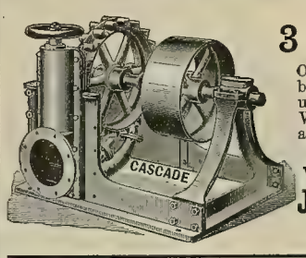

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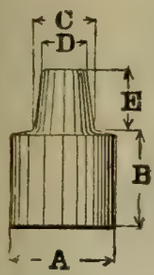

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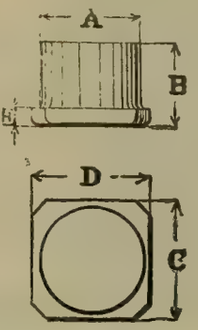

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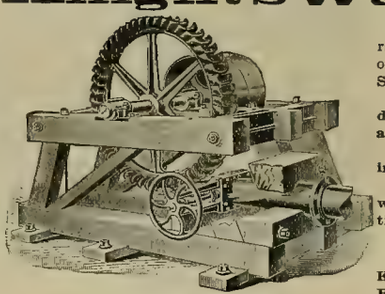

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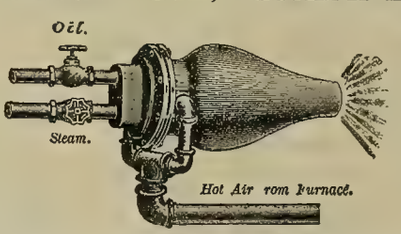

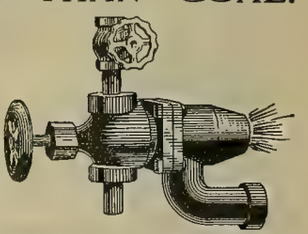

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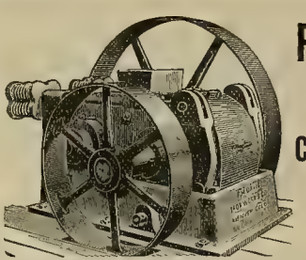

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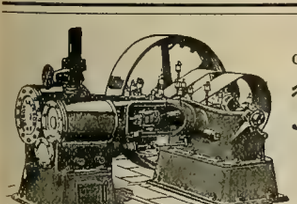

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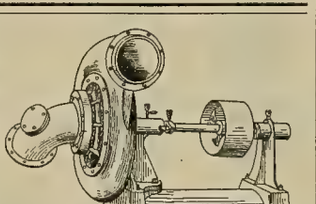

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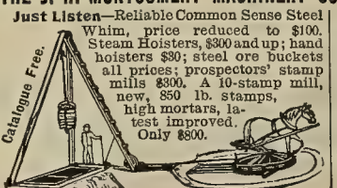

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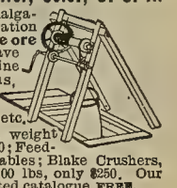

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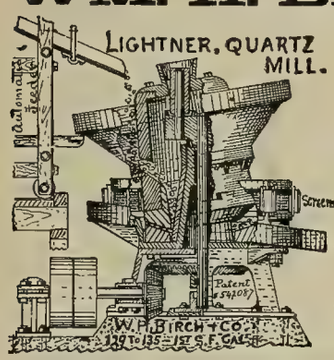

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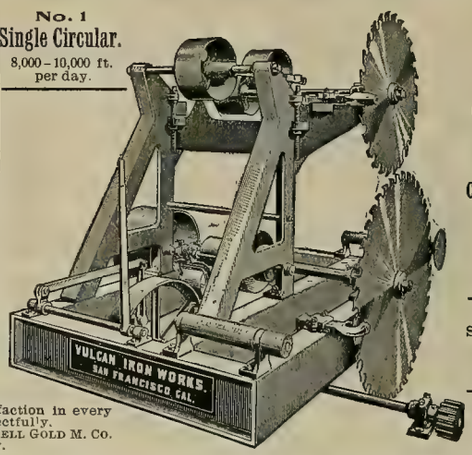

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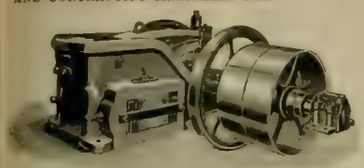

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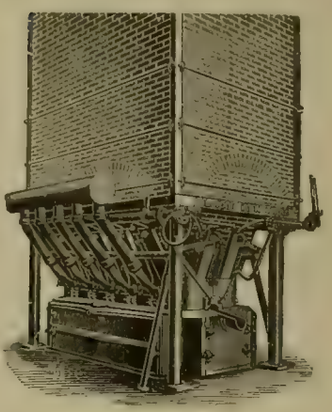

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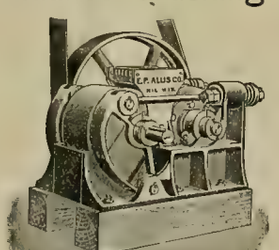

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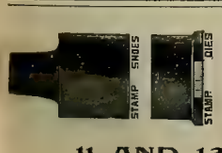

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Cheaper Than Cast Iron.

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RIX COMPRESSED AIR MACHINERY COMPANY,

11 AND 13 FIRST STREET, SAN FRANCISCO, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Oct. 8, 1896.

Business in all branches of trade continues good with the buying outside of winter stocks, confined to nearby wants. The strength of wheat and a better general average price for other farm products have a beneficial effect. If crop advices regarding wheat are correct then good prices, higher than for several seasons, will rule this winter and next spring. With this the case it will have quite a favorable influence on business particularly with a continued boom in gold mining. The opinion prevails that after election there will be much better times in business circles, without regard to who will be elected President. This opinion is largely based on the fact that stocks of goods, for the season, are light while consumers have been buying sparingly, fearing that there might be a panic. Whenever the latter is expected and prepared against, experience has taught that it does not come.

The local money market is still working easier, with better accommodations given at commercial banks, but the savings banks are still working close and will continue to do so until after election. It is stated that collections are fair to good, while the banks and sub-treasury have a considerable surplus of funds in hand. More gold is on the way from Australia, with other shipments expected to follow. The movements of crops have called for considerable money; but, with free outward shipments, it is again coming back into regular channels.

Eastern mail advices are to the effect that there is a steadily growing ease, although the scarcity of berth room for shipments to Europe is somewhat against it. The *Wall Street Journal* says that time money is in better supply at 6 per cent; but borrowers, as a rule, do not wish accommodations longer than until after election. The Government has been disbursing over $5,000,000, which has had a favorable influence, as also other liberal disbursements at financial circles. At New York there is a growing feeling that the importation of gold may slack off for a short time, owing to an advance in bank rates and close money markets abroad.

It appears that the Continental demand for gold in the London open market and at the Bank and the demand for gold to move the Egyptian cotton crop were quite as powerful factors in determining the Bank of England directors on an advance in the discount rate as the American demand. Berlin has steadily drawn gold from London both on Austrian and Russian account. Exchange rates favor the operation as far as Germany is concerned. How much gold has gone to Austria and how much to Russia is not known, as it is going through Berlin, on which both Vienna and St. Petersburg are apparently drawing. The Austrian demand is explained by the fact that credits created by former loans are not exhausted, while Russia as is known always keeps large credits at Berlin and London. Austria's delay in fully resuming specie payments is causing doubt as to the entire success of the operation. The Austro-Hungarian Government has to meet large interest demand on her foreign debt every year, which is, apart from politics, the chief obstacle to complete resumption.

New York Silver Prices.

NEW YORK, Oct. 8.—Following are the closing prices for the week:

	—Silver in— London.	N. Y.
Friday	30 5-16	65⅝
Saturday	30 5-16	65⅝
Monday	30 5-16	65⅝
Tuesday	30⅛	65⅝
Wednesday	30	65
Thursday	30	64⅞

	Copper.	Lead.	Iron.	Tin.
Friday	10 65	2 75	10 25@12 25	12 80
Saturday	10 65	2 75	10 25@12 25	12 80
Monday	10 65	2 70	10 25@12 25	12 75
Tuesday	10 65	2 70	10 25@12 25	12 70
Wednesday	10 65	2 70	10 25@12 00	12 65

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	02½
New York Telegraphic Transfer	05
London Bankers' 60 days	$4.84
London Merchants	$4.83
London Sight Bankers	$4.86
Refined Silver, per oz., 1000 fine	64⅞
Mexican Dollars	50½@51½

SILVER.—The market went off towards the close of the week, with a weak closing. At the decline it is stated that considerable is coming out at the East and abroad, which may cause still lower prices. At the declining prices it is said there has been concentrated buying by strong parties. If this proves correct, then much better prices are apt to rule when the selling pressure is well over.

Pixley & Abell report shipments of silver from London to the East from January 1 to October 1 as compared with the corresponding period of last year as follows:

	India.	China.	Straits.	Total.
1896	£2,893,778	£574,413	£545,686	£4,013,877
1895	3,980,615	2,119,573	949,946	7,050,234

The above shows quite a falling off. Where the bullion that has been extracted has gone is a conundrum. Unless the arts and other Governments have more this year than last, it must be in speculators' hands.

MEXICAN DOLLARS.—The market is quiet with buyers favored at lower prices in sympathy with a decline in silver.

COPPER.—The market has sold to lower prices under more competition selling. The consumption in this country is only fair but abroad it continues large. It is stated that the United States will soon begin to take more freely.

The market is quoted as follows:

Ingot, jobbing	—@13½
Ingot, wholesale	—@12½
Sheet copper	—@16½

LEAD.—The market has eased off slightly under more offering at the East with consumers fairly well stocked.

Our market is quoted as follows:

Pig	—	@	3 60
Bar	—	@	3 95
Sheet	—	@	5 25
Pipe	—	@	4 50

ANTIMONY.—The demand is fair, with the market steady at 7¾@8⅛c in a jobbing way. New York mail advices quote 7⅜ for Cookson's, 6⅝c for Hallett's and 6½c for Japanese, from store.

BORAX.—The movement Eastward continues quite free.

The market is quoted as follows:

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	5¼
Concentrated, "	5⅝

QUICKSILVER.—The market is steady at quotations.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

SHOT.—There is nothing new to report.

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do. " "	1 45

TIN.—The markets are still lower, being unfavorably affected by lower prices for silver. There is very little inquiry.

Pig, per lb		13½
Plate, I C coke, heavy, per box	—	@4 05
" " " light, "	—	@ 3 95

POWDER.—There is a continued free demand.

The market is quoted as follows:

Hercules, No. 1, per pound	11½c
No. 2, " "	8½c

IRON.—Eastern mail advices are as follows: The feeling in the iron trade is steadily improving. We cannot hope to reach normal conditions until the currency question is definitely settled, but it is gratifying to note a rise in the tide. In the Chicago districts, some large inquiries are in the market. One of them calls for a block of from 6,000 to 15,000 tons of Bessemer. Bessemer pig has advanced to $11 in the valleys as the asking price for delivery next year. In bars and merchant steel, contracts are more liberal. Pittsburg reports from 7,000 to 8,000 tons to be closed at an early date. It is believed at Philadelphia that the mills next year will have all the business they can handle. The price of pig iron at St. Louis has improved about 50 cents a ton in the last thirty days.

Our market is quoted as follows:

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 50
Gartsherrie	21 50	23 50

Bolt.....¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing..... 20

COAL. — The market is essentially unchanged since our last week's issue. For shipments the feeling continues easy.

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 00@ 5 50
Coos Bay	—@ 4 50
Cannel	—@ 8 50
Egg, hard	—@11 50
Wallsend	—@ 7 00
Scotch Splint	—@ 7 50
Brymbo	—@ 7 50

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	18 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—The demand is fair for home and export.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—There was some cutting at the East below Association rates, but it seems as if the latter have stopped it for awhile at least. It is stated that at the meeting to be held the last of this month a new price list will probably be issued.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

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MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delin'q't and Sale.		Secretary.
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24	Sept 24	Oct 24	E D Farish, 632 Market
Bay State M & D Co, Cal	33	3c	Aug 21	Sept 30	Oct 20	F E Luty, 330 Pine
Central Eureka	3	2c	Sept 3	Oct 10	Nov 2	Wm A M Van Bokkelen, 320 Sansome
Channel Bend M Co	4	2c	Sept 14	Oct 16	Nov 7	J P Langhorne, 39 Sutter
Crown Point M Co, Nev	68	20c	Aug 18	Sept 23	Oct 13	J Newlands, Mills Building
De Soto G M Co	1	7c	Sept 7	Oct 10	Nov 9	E H Clark, Mills Bldg
Goleta M Co	4	20c	Sept 21	Nov 2	Dec 2	D M Kent, 330 Pine
Quaker G M Co	40	12c	Sept 7	Oct 8	Nov 5	C W Poindexter, 418-420 Market
Gould & Curry S M Co, Nev	79	15c	Sept 1	Oct 5	Oct 27	A K Durbrow, 309 Montgomery
Marguerite G M & M Co	4	20c	Sept 21	Nov 10	Dec 15	Chas Peach, 237 12th
Montecito M Co	3	15c	Sept 21	Nov 2	Dec 2	D M Kent, 330 Pine
Occidental Con M Co, Nev	24	10c	Sept 2	Oct 8	Oct 29	A K Durbrow, 309 Montgomery
Potosi M Co, Nev	46	25c	Sept 28	Nov 4	Nov 24	Chas E Elliott, Nevada Block
Savage M Co	90	20c	Oct 2	Nov 4	Nov 24	E B Holmes, Nevada Block
Sterling M Co	3	15c	Sept 21	Nov 2	Dec 2	D M Kent, 330 Pine
Sumdum Chief M Co	1	15c	Sept 2	Oct 19	Nov 5	H G Stevenson, Hobart Bldg
Troy M & Dev Co	1	12½c	Sept 7	Oct 14	Nov 7	Otto Ryst, 525 Front
Union Con S M Co, Nev	53	20c	Aug 25	Sept 28	Oct 22	A P Swain, 309 Montgomery
Utah Con M Co	23	5c	Sept 10	Oct 13	Nov 2	A W Havens, Nevada Block
Yellow Jacket S M Co	61	25c	Sept 11	Oct 15	Nov 20	W H Blauvelt, Mills Bldg

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Anchor Coal and Development Co	E D Farish, 632 Market	Oct 20
Idlewild G M Co	D C Bates, Nevada Block	Oct 14
Con Cal & Va M Co	A W Havens, Nevada Block	Oct 19

Mining Share Market.

SAN FRANCISCO, Oct. 8, 1896.

The market held to low prices under light business up to Tuesday, when a better tone set in, and with more active trading there was an advance at the day's closing of from 10 to 30 per cent on Saturday's prices. Yesterday (Wednesday) business was fair in the morning, but fell off as the day passed. The closing was very quiet. The better-informed are outspoken in the belief that it is a freeze-out, not by the small pools but by the moneyed inside. They say that this opinion is warranted by the work that has been and which is being done in the mines on the Comstock lode. It is stated in better-informed mining circles that within the past few months two or three quite important ore strikes have been made, but, owing to the share market not being in the best condition for securing several large holdings, the finds were ignored and no mention made of them, while the work was either turned or else stopped. These reports are given for what they are worth, yet the strong depression of the share market, the levying of assessments and mining secretaries crying hard times, seem to give color to them. Manipulators do not sell when everything is made to look bad, but they buy. They only sell on an active and advancing market and on reports of ore strikes. This is the history of the Comstock mining share market, and will continue to be so long as there is gambling in them. There is a continued scarcity of shares for shorting the public, which is accepted by operators of lower prices so as to gather in more from outside holders scared into selling. The inside do not want short sellers interfering with their freeze-out game by buying when the market is sent lower through cross-orders, fair to poor mine reports and levying assessments. It is a great game, this. Dealings in the Bodies have been light, with very little variations in prices.

The following mining companies report cash on hand October 1: Alta, $171; Alpha Consol, idated, $8830; Best & Belcher, $14,977; Belcher, $15,989; Bodie Consolidated, $534, with $3602, of unsold bullion; Bulwer Consolidated, $4479, with $6430 of unsold bullion; Bullion, $8213; Caledonia, $4190; Confidence, $6151; Chollar, $15,048; Consolidated Imperial, $3456; Consolidated California & Virginia, $14,816; Church, $6858; Challenge Consolidated, $157 and owes money at bank; Consolidated New York, $1274; Crown Point, $13,002; Exchequer, $1846; Gould & Curry, $2185, with $5000 due on the company's note at the Nevada Bank; Julia Consolidated, $41; Hale & Norcross, $472, and 90 tons ore valued at $1500; (due the bank $3000); Mexican, $3382; Mono, $1633; Overman $5565; Ophir, $1679; Occidental Consolidated, $939, with $5500 due the Nevada Bank and expenses of the mine for the past month unpaid. The greater part of an assessment of 10 cents per share is to be collected, and the proceeds of 15⅓ tons of concentrates, valued at $149 per ton, are to be received. Potosi $139; Savage, $4; Silver Hill, $795; Sierra Nevada, $21,954; Summit, $410; Segregated Belcher, $529; Standard Consolidated, $22,597, with bullion and concentrates valued at about $11,000 in transit; Silver King, $588; Syndicate, $700; Union Consolidated, $16,434; Utah Consolidated, $351.

Lady Washington has no cash on hand and owes $327.

From the Comstock mines there is nothing new to report, so far as official letters go, but private advices are of a more encouraging character, yet in operating it is not safe to be governed by the latter even if they are thoroughly correct for insiders having control at the mines and in San Francisco can carry out any plan desired by them. In Alta the management appears to be avoiding striking ore in the Keystone ledge, probably in hopes of freezing holders out of their shares. In Overman the work is about as heretofore reported. Some ore has been milled which returned something over $2700 gross. Seg. Belcher milled some ore which yielded gross about $2400. The work in this mine is essentially unchanged. Belcher raised the past week 60 cars of fair grade ore. In Crown Point work is continued in several levels. It is said that if the management desires considerable good to high grade ore can be shown up. Nothing comes from Kentuck or Yellow Jacket regarding work. It looks as if shares, and not ore, are wanted. Confidence milled some ore which gave a gross yield of over $1600. The work is practically unchanged. In Con. Imperial the work is continued in the joint Challenge, Confidence and Con. Imperial crossdrift and also in the west crossdrift No. 3. They ought to find some ore before long, provided they want to. In Alpha they are still working west on the 500-level. They do not appear particularly desirous of showing up the good to high grade ore known to be in that direction. There is no change reported in the work that is being done in Bullion, Potosi or Chollar. Hale & Norcross is still raising some good ore. It will nearly pay expenses. The mine is said to be looking well, but more work will have to be done before much of encouragement can be said. The work in Savage, as outlined, indicates more activity before long. The joint Gould & Curry and Best & Belcher east crossdrift is being pushed slowly ahead. In Con. Virginia the work on the 1650-foot level near Best & Belcher and that on the 1000-foot level near Ophir is said to show an improvement. More ore and assaying higher was raised the past week, but it hardly pays running expenses yet. The work in Ophir on the 1000-foot and central tunnel levels attracts some attention, but it is not likely much ore will be found. The work being done in Mexican, Union, Sierra Nevada, Utah and Andes is about the same as heretofore published in this department.

Operations on the Brunswick lode seem to be attracting more attention as work progresses in several of the mines, but it is not at all unreasonable to assert that where the public think ore will be found there will not be a big body, but when it will be developed at another point, if it is ever shown up. In Occidental they are running on the 850-foot level for the downward contiuation of the ore found above. The mill has been closed down. The run does not appear to have been a great success. It is not at all unlikely that the ore will have to be treated differently in the future. The work in Chollar on the 200-foot and 300-foot levels is about the same as heretofore reported. On the 400-foot level the work is growing in interest. It is said to be showing an improvement on the 300-foot level. In Hale & Norcross active work is still the order. That towards or in Savage is quite

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encouraging. The work in Gould & Curry is attracting more attention. An ore strike is among the possibilities. In Best & Belcher and Con. Virginia no change is reported in the work.

From the Bodie district nothing of an important character is at hand. Exploiting work is still the order. Ore continues to be raised and milled by Bodie, Standard and Bullion.

From Silver King, Arizona, improving news comes to hand, but it will take time yet for results to be known.

The following illustrates the changes of the week:

MINES.	Oct. 1.	Oct. 8.
Alpha	$ 13	....
Alta Consolidated	....	$ 14
Andes	....	....
Belcher	54	62
Best & Belcher	88	96
Bodie	60	..
Bullion	18	....
Challenge	53	50
Chollar	2 15	2 20
Confidence	1 35	....
Consolidated California and Virginia	1 70	1 75
Consolidated New York	....	....
Crown Point	40	....
Exchequer	....	....
Gould & Curry	....	74
Hale & Norcross	1 40	1 45
Justice	....	....
Mexican	49	....
Ophir	88	1 20
Overman	13	15
Potosi	73	76
Savage	....	51
Sierra Nevada	67	71
Union	55	60
Utah	....	07
Yellow Jacket	30	31

San Francisco Stock Board Sales.

SAN FRANCISCO, October 8, 1896

9:30 A. M. SESSION.

100 Alta 14
400 Belcher 59
350 Best & Belcher 98
300 Challenge 50
200 Chollar 2 15
100 Con Cal & Va 1 75
600 Gould & Curry 70
500 Potosi 76
150 H. & N 1 45
100 Yellow Jacket 31
300 Belcher 62
500 H. & N 1 40
300 Ophir 1 20
300 Potosi 75
200 Savage 51
450 Sierra Nevada 68
400 Union 58
300 Utah 07
300 Overman 15
600 Union 60
300 Alta 14
300 Bulwer 40

SECOND SESSION—2:30 P. M.

400 Gould & Curry 74
100 Chollar 2 20
500 Potosi 76
150 H. & N 1 45
100 Yellow Jacket 31
300 Belcher 62
800 Sierra Nevada 71
300 Utah 07
100 Overman 15
400 Union 60
300 Alta 14
300 Bulwer 40

ANNUAL MEETING. The Annual Meeting of the stockholders of the Anchor Coal and Development Company will be held at the office of the Company, No. 632 Market St., room 5, San Francisco, California, on TUESDAY, the 20th day of October, 1896, at 1 o'clock P. M., for the purpose of electing a Board of Directors for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, October 17th, at 12 o'clock M.

E. D. FARISH, Secretary.

Office—Room 5, No. 632 Market street, San Francisco, California.

ANNUAL MEETING.—THE REGULAR ANNUAL meeting of the stockholders of the Consolidated California & Virginia Mining Company will be held at the office of the company, room No. 29, Nevada block, San Francisco, California, on MONDAY, the 19th day of October, 1896, at the hour of 1 P. M., for the purpose of electing a board of directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Thursday, October 15, 1896, at 3 o'clock, P. M. A. W. HAVENS, Secretary.

Office Room No. 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Larsen & Harris, in the Larsen mine, near Placerville, El Dorado Co., to deposit tailings in North Canyon; from A. F. Sheehan, in the Blue Eyes Mine, in Duncan Canyon, Placer Co., to deposit tailings in a dry ravine; from the Plymouth Consolidated Gold Mining Co., in the Bell & Dorsey Mine, at Indian Diggings, El Dorado Co., to deposit tailings in Indian Diggings Creek and Scott Creek; from E. A. Wiltsee, in the Gold Run Mine, at Gold Run, Placer Co., to deposit tailings in Canyon Creek; and from H. Spaulding to work in the Craycroft Mine, near Downieville, Sierra Co., to deposit tailings in Hughes' Ravine, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on October 12, 1896, at 1:30 P. M.

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By a Practical Mining and Mill Man, a party having had sixteen years of experience on the Comstock and fifteen years in California gold mining and milling and understands the practical mining and milling in every branch and detail. He is also a first-class accountant. The best of references given. No objection to going into foreign country, as the party speaks English, German, French, Spanish and Dutch.

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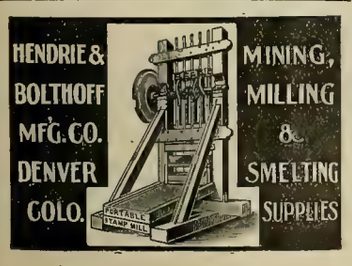

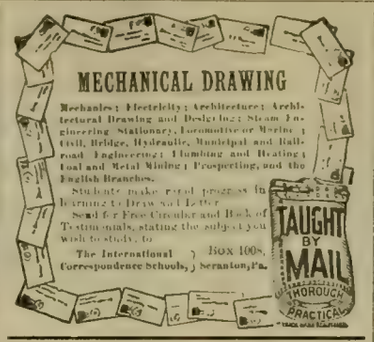
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Assessment Notice.

MARGUERITE GOLD MINING AND MILLING COMPANY. Location of principal place of business, San Francisco, California; location of works, Auburn, Placer county.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-first (21) day of September, 1896, an assessment (No. 4) of twenty (20) cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 237 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on TUESDAY, December 15, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. PEACH, Secretary.

Office—237 12th street, San Francisco, Cal. Office hours from 4 to 6 o'clock P. M.

DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Cert.	No. Shares.	Amt.
E. C. Cain	170	2,500	50 00
E. C. Cain	171	2,500	50 00
C. L. Dingley, Jr	72	800	16 00
C. L. Dingley, Jr	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	169	3,803	76 06
E. C. Godfrey, Trustee	160	6,667	133 34
E. C. Godfrey, Trustee	166	1,333	26 64
E. C. Godfrey, Trustee	167	1,899	36 18
E. C. Godfrey, Trustee	141	1,667	33 34
E. C. Godfrey, Trustee	142	3,000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	83	2,000	40 00
J. F. R. Landis	138	1,000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6,000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2,500	50 00
Jos. A. Pratt	2	2,500	50 00
Jos. A. Pratt	3	2,500	50 00
Jos. A. Pratt	54	2,500	50 00
John E. Todd	5	2,500	50 00
John E. Todd	6	2,500	50 00
John E. Todd	9	2,500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until WEDNESDAY, October 21st, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California.

E. C. GODFREY, Secretary.

DELINQUENT SALE NOTICE.

ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California; location of works, Kelso, Cowlitz county, Washington.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 7) levied on the Twenty-fourth (24th) day of August, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
Mrs. Edith Grey	222	100	3 00
Mrs. Edith Grey	223	100	3 00
R. M. Woodford	559	100	3 00
Jas. E. Ager, Trustee	651	500	15 00
W. H. Gregory	688	500	15 00
W. H. Gregory	689	500	15 00
W. H. Gregory	697	500	15 00
F. M. Meigs	848	350	10 00

And in accordance with law, and an order from the Board of Directors, made on the 24th day of August, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room 5, 632 Market St., San Francisco, California, on SATURDAY, the 24th day of October, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. D. FARISH, Secretary.

Office—No. 632 Market Street, Room 5, San Francisco, California.

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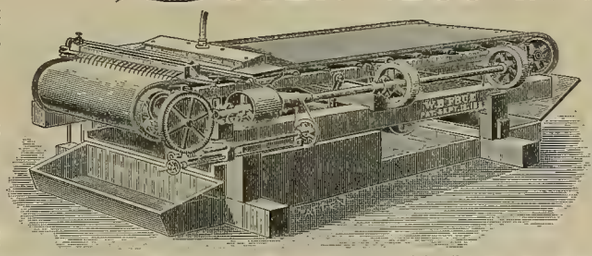

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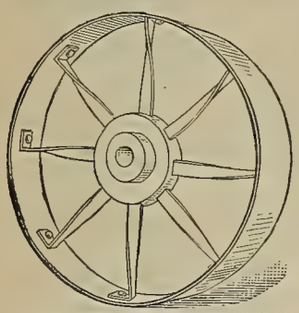

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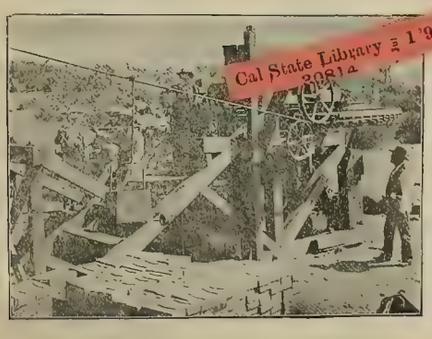

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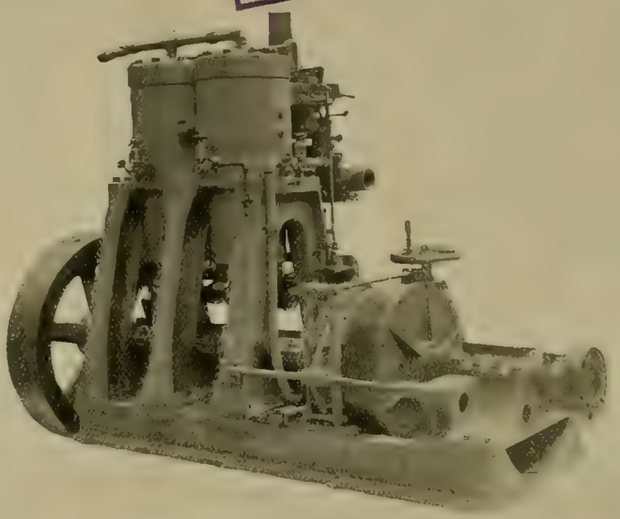
The Gasoline Engines of the Chetco.

The accompanying cut shows one of a pair of gasoline engines installed in the schooner Chetco by the Hercules Gas Engine Works of this city, and marks the beginning of a general use of twin screws driven by gasoline engines in coasting and bay craft. The builders of these engines were surprised at the results obtained from certain improvements applied in this case. The required power was 40 H. P. in each engine; so cylinder capacity, etc., was figured accordingly. In building the engines compression received particular attention; a newly designed and improved sparking device was designed, and a new generator suitable for vaporizing gasoline or distillate oils was tested with satisfactory results. The first engine, as soon as put in motion, was subjected to a power test and developed 53+ H. P. The second engine was not tested until it had several days' run and developed over 60 H. P., all of which gain in power was due to a higher and more efficient compression, a self-regulating and almost perfect generator, and a sparking device which permits of the point of ignition being changed to obtain the greatest efficiency from a given quantity of fuel.



THE CHETCO'S GASOLINE ENGINE.

By the application of an ingenious device these engines are made self-starting, doing away with the unnecessary small starting engine or the bugbear of having to turn the flywheel several times to start. In starting, the point of ignition is changed so that the impulse takes effect with the crank considerably over the center, the point of ignition being advanced after the engine gains speed. In going ahead the engine is directly connected to the propellor shaft. The turning of a small hand wheel starts, stops or reverses the propellor at the will of the operator. The electrodes are heavy and made of hardened steel; the contact points being practically indestructible. All the springs are external and adjustment is possible while the engine is running. Arrangement of parts is such that in case of repairs any part can be removed without disturbing others. These engines weigh slightly over 8500 pounds and occupy a space 3 feet wide, 7 feet long by 6 feet high, each. The engine room in the Chetco is 11 feet wide by 12 feet long, with ample space to get all around the engines.

Besides these two 60 H. P. engines for the Chetco, just installed, the Hercules Engine Works are building a 35 H. P. marine for the Morgan Oyster Co., a 35 H. P. for New Zealand people, and a number of large hoisting and pumping engines for mines in this State.

The excellent results obtained in the Chetco engines will no doubt do much towards increasing the use of gasoline and distillate burning engines in coasting vessels and other small craft.

THE State of Nevada promises to attract more attention from the mining world within a year than it has for many years past. A number of large gold mines have been started up and much development and prospecting work is going on, not in one or two districts, but practically all over the State. The Silver State is taking on the air of having a gold mining boom. The Southern Pacific has made Reno a terminal point and so materially reduced freight rates into that State. The development of agriculture has brought down the price of many supplies required, and, with the reduced cost of milling and mining, it is expected that many abandoned mines will in time be re-opened.

THE Pacific Coast owes its large factories entirely to mining. But for mining the Union Iron Works would never have been able to compete with the East and turn out, as it is doing, the finest kind of war ships in the world. Mining brought giant powder into the world; has been the cause of the invention of the Pelton and other water wheels, far superior to others hitherto used. It has introduced the use of light riveted iron pipes. The discovery of street cable railways was made through the use of a similar cable in the Dardanelles drift mine in Placer county. There will come a time when this will be a great manufacturing State on account of the facilities for obtaining electric power from the streams of the Sierras. There are already many large power transmission plants in contemplation or in course of construction for supplying the mines along the mother lode, and these will be the direct cause of starting up many other new industries.

A NEW GOLD SAVING PROCESS. *See page 316.*

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J. F. HALLORAN.....General Manager

San Francisco, October 17, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—The Cheteo's Gasoline Engine; A New Gold Saving Process, 313. Hot Blast Stove for Silver-Lead Smelting and Copper Matting, 318.

EDITORIAL.—The Gasoline Engines of the Cheteo; Much Attraction Toward the State of Nevada; Much Is Owing to Mining in This State, 313. Visit of Hamilton Smith; The Coming Convention; The Northwest Mining Convention; A Land Office Interference; Locators' Rights; A Mining Lawyer Upon the Supreme Bench, 314.

SCIENTIFIC PROGRESS.—Emmens' Alchemy; An Interesting Source of Lighting; A New Source of Vanadium Compound; Circulation of the Papers of the World; Information Upon Scientific Questions; Technical Society Work; Spontaneous Combustion of Coal on Ship Board, 317.

MECHANICAL PROGRESS.—A Hot Blast System for Copper Matting and Silver-Lead Furnaces. 318.

ELECTRICAL PROGRESS.—Electric Railway Motors; Roentgen Rays, 318. "The Present Status of Power Transmission;" An Agreement Made; An Electric Plant for Electrocution; Photographing Objects by Roentgen's Method, 319.

PRACTICAL INFORMATION.—The Future of the Sahara; Torpedo Boats; Life-Saving Stations; Canals a Success, 319.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories. 322-3.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 330.

MISCELLANEOUS.—Concentrates, 315. A New Gold Saving Process; Extent of Canadian Gold Fields; The Cyanide Process in the United States, 316. Street-Car Lines in New York, 319. Notices of Recent Patents; Obituary; Recent Patents; Coast Industrial Notes; Recently Declared Mining Dividends; Personal; Recent California Mining Incorporations, 320. Books Received, 323.

The Coming Mining Covention.

There were represented at the last convention of the California Miners' Association, thirteen counties. This year sixteen counties will send delegations. The growth of the mining industry all over the State has stimulated interest in the Miners' Association. When it was first organized there was much work to do and little money to do it with. More than that, the industry altogether was in such a bad way that they were compelled to work against heavy odds. The Association has done good work. It has accomplished a fair proportion of what it set out to do, but as the industry increases the duties of such an organization are increasing. There will be much more opportunity for its good offices in the future even than there has been in the past.

So far the Association has had considerable difficulty in collecting the necessary funds, and its officers and even attorneys have contributed their services free of charge. It seems to us that the time has come when the Association should have a permanent home or headquarters in this city, with a paid Secretary as suggested by Mr. Sonntag. With such an office and an officer to care for the details much more satisfactory work can be done by those disinterested individuals who have so freely in the past given their services to the Association.

Among the questions that will probably come before the convention will be the appointment of a legislative committee to represent the interests of the miners next winter in Sacramento. The legislative committee appointed last year had much business to attend to in connection with the mineral land bill and other matters in Congress, and did good work. Much more will be expected of a similar committee at the next session of Congress. At the last session of the State Legislature there was not so much of moment before that body as there probably will be at its next session.

The State Mineralogist has recommended a radical change in the work of the Mining Bureau in the separation of the mining work and geological survey work. He has also suggested that some provision be made for inspection of mines. It is likely that these suggestions will be recommended to the Legislature by the Governor. It is important that the Miners' Association be well represented at Sacramento to see that satisfactory laws be enacted, and that sufficient funds be appropriated for carrying on the work of the bureau. No industry has ever asked less than that of mining from the State, and none has received less.

We have already suggested the advantage of having a representative of mining in the Board of Regents of the State University. Governor Budd will during his term of office appoint at least two regents, and he certainly would give heed to recommendations from such a representative and influential body as the Miners' Association in this matter. There are enrolled in the College of Mines of the State University more students than in any other technical college in that institution, and yet less money is spent upon it than upon any other. California has at Berkeley one of the great universities of the country, and there is every reason why it should have there the best mining school in the world.

A Land Office Interference.

The necessity for curtailing the power of the land department in the disposal of the public lands was made glaringly apparent by the efforts of the Miners' Association to prevent the legal absorption of the mineral lands lying within the limits of the several railroad grants in this State. The question was more than a local one and has engaged the attention of sister organizations in the mining States, and finally became a national issue by the adoption of a drastic plank in the platform of one of the recent national conventions.

Another necessity for curtailing the power of the land department of the United States is evidenced by its recent treatment of an act of Congress passed at its last session, which was designed to foster the interests of the miners, as well as of the public at large, by permitting the use of a right of way to the extent of 25 feet, together with the use of necessary ground, not exceeding forty acres, upon the public land and forest reservations of the United States, by any citizen of the United States, for the purpose of generating, manufacturing or distributing electric power, under general regulations, to be fixed by the Secretary of the Interior.

The advantages in utilizing this permission in producing electricity by water power is apparent, but the Secretary of the Interior, under the power granted to him, has promulgated such regulations as practically to deprive the act of any real value.

Mr. A. H. Ricketts of this city has called our attention to these instructions, which were drawn up by Edward A. Bowers, Acting Commissioner of the Land Office, and approved by Hoke Smith, Secretary of the Interior. Section No. 5 of these regulations is as follows: "If the application is satisfactory to the Department, the Secretary of the Interior will give the required permission in such form as may be deemed proper, according to the features of each case. And it is to be expressly understood in every case that the permission extends only to the public lands in the United States not within the limits of any park, forest, military or Indian reservation; that it is at any time subject to modification or revocation; that the disposal by the United States of any tract crossed by the permitted right of way is of itself, without further act on the part of the Department, a revocation of the permission, so far as it affects the tract; and that such permission is subject to any future regulations of the Department."

As we have stated, this article of the regulations of the land office practically annuls the law passed by Congress. It leaves the people who might have been benefited in exactly the same position as if no such law had been passed. For should any one attempt to take advantage of its provisions and obtain permission of right of way over government land any one else might come in and locate the ground over which his right of way runs and it would be immediately revoked under the Secretary's rulings.

This is a matter of special importance to the mining industry in California in view of the large number of enterprises lately undertaken for supplying electric power to the mines. We would suggest that the Miners' Association take up the question at its convention next month.

It is possible that if some company or companies interested would bring a test case before the Federal courts the trouble may be remedied by a judicial declaration of the invalidity of the Secretary's regulations.

It is reported on reliable authority that one of the chief causes for Hamilton Smith's coming visit to California is to have an examination made of the Mariposa grant. In another column last week and this, we gave some account of the proposed deal, which will mean, if carried out, the purchase of the property by the Exploration Company, who will place it on the London market.

The Northwest Mining Convention.

At the annual meeting of the Northwest Mining Association the president, G. B. Dennis, delivered an able address. Speaking of the progress of mining, he said:

What we call the science of mining came down to us from hoary antiquity, and has has grown like all others of the human arts, from the rudest beginnings in the rude twilight of the infancy of our race, ages and ages before the sun of history rose above the horizon of recorded time. Onward, onward and ever onward marches the industry of mining. One by one we have cut away the rude appliances and methods of the past; one by one we have seized the new weapons of modern practice and organized them into a harmonious whole, till the miner who began in ages past by fashioning a hammer of a river pebble, and wearing a chisel out of a wayside stone, and clipping the glittering specks from some chance outcrop, has become a broad-minded scientist, versed in minerals and the world's structure, a possessor of the secrets of chemistry, a wielder of mechanical power, a harnesser of lightning.

Speaking of the proposed establishment of a Secretaryship of Mining in the Federal Government, he said:

The office of minister of mines for the British provinces has proven a great boon to mining there, and it is with the same intent that we endeavor to establish the same thing for these United States. Our great mining interests are fast awakening to its importance, and demand that it receive at the hands of the United States Government that recognition which shall place it upon a parity with other commercial industries. We hope to be successful.

Locators' Rights.

In the very recent case of Black vs. Elkhorn Mining Company (163 U. S. 445), the United States Supreme Court says:

The interest in a mining claim, prior to the payment of any money for the granting of a patent for the land is nothing more than a right to the exclusive possession of the land based upon conditions subsequent, a failure to fulfill which forfeits the locators' interest in the claim. To sum up as to the character of the right which is granted by the United States to a locator, we find: (1) That no written instrument is necessary to create it. Locating upon the land and continuing yearly to do the work provided for by the statute gives to and continues in the locator the right of possession as stated in the statute. (2) This right, conditional in its character, may be forfeited by the failure of the locator to do the necessary amount of work; or if, being one among several locators, he neglects to pay his share for the work which has been done by his co-owners, his right and interest in the claim may be forfeited to such co-owners under the provisions of the statute. (3) His interest in the claim may also be forfeited by his abandonment, with an intention to renounce his right of possession. It cannot be doubted that an actual abandonment of possession by a locator of a mining claim, such as would work an abandonment of any other easement, would terminate all the right of possession which the locator then had.

It is time that there should be a mining lawyer of recognized standing upon the Supreme Bench of the State of California to avoid conflicting—and at times, almost absurd—decisions now coming from the Bench, which show a lamentable weakness in that body in the knowledge of mining laws. The appointment of Judge Field to the Supreme Bench of the United States, after he had acquired in California a splendid knowledge of mining law, has enriched the reports of that court with opinions which will always remain standard. But for his presence upon the Bench there would now be much more confusion in mining law than there is in the West, and, as it is, it is bad enough. Mining laws have grown largely out of and are based upon local mining customs, just as much of our law is based upon the common law which grew out of old English customs. Naturally more ability and knowledge of the subject is required to interpret the laws regarding mining than any other industry, for the reason that they are based not upon old laws or customs, but upon the rules adopted by the miners in comparatively recent years. The Supreme Court itself has in its hands the appointment of the Court Commissioners and in that has the means of remedying what is getting to be an evil. It might be well for the Miners' Association to take up this matter and ask its members to use their influence with future political conventions to secure the nomination of at least one mining lawyer for Justice of the Supreme Bench.

Concentrates.

THE Louisiana Mining Company in Mariposa county propose to erect a 10-stamp mill.

VICTOR, the leading town of the Cripple Creek district, claims a population of 8000.

THE mill at the Metropolitan mine, at Moore's Flat, Nevada county, has been started up.

THE Las Amarillas mines in Sonora, Mexico, are producing from $110,000 to $120,000 gold monthly.

THE owners of the Lighthouse mine in Amador county propose to erect a 5 or 10-stamp mill shortly.

M. PABLO LE ROYAL, the French mining engineer, recently purchased large coal properties in Puebla, Mexico.

THE Frazier Mining Company proposes to put in a 5 or 10-stamp mill on their property at Granite Basin, Plumas county.

THE first roasting furnace for the reduction of ores ever built on the Comstock is nearly ready for use at the Kinkead mill.

PREPARATIONS are being made to put extensive machinery in the Sand Hill drift gravel mine near Camanche, Calaveras county.

IT is announced that R. U. Goode, of the U. S. Geological Survey, will soon go to Eureka, Nevada, to make a survey of that district.

THE Montana mine, in Willow Valley district, Nevada county, has been bonded for two years to Francis N. Burns and C. H. Tubbs.

IN Corea, where several Colorado mining men have lately gone, there are said to be nearly 3000 mines worked by the crudest methods, and mostly placers.

SAMUEL NEWHOUSE, who has made some investments for his London syndicate in this State, has purchased the Henry M. group of ten claims near Bingham, Utah.

AT no period since the discovery of gold has such large sums of money been expended as during the past two years on the divide above Forest Hill, says the Colfax *Sentinel*.

ACCORDING to *Modern Mexico*, the old Zubiate mine, nine miles east of Minas Prietas, has been worked for over 100 years, and in that time has produced over $15,000,000.

SIXTY-FIVE sacks of $65,000 ore were stolen from the May Belle mine, Victor, Col., lately. The company has no clue, but it sought revenge by discharging every man about the works.

THE Gold Exploration and Development Company of British Columbia have bonded the Flossie L. and Little Darling mineral claims, near the Jumbo, in the Rossland district, for $100,000 each.

THE Calaveras *Chronicle*, published at Mokelumne Hill, is the oldest weekly paper on the coast, having made its first appearance on October 10, 1851. The Shasta *Courier* comes next on the list.

THE War Eagle and Iron Mask, two of the leading mines of the Trail Creek district, have been sold to London capitalists. The prices are not given out. The War Eagle has paid $197,000 in dividends.

THE first locomotive engine ever built and run successfully was in a mine in England. Mining has been the direct cause of more inventions and improvements in machinery than any other single industry.

ACCORDING to the Trinity *Journal*, a silver ledge has been discovered in Stuart's Fork in that county, in which the ore is claimed to be of high grade. This is the first silver mine discovered in Trinity.

IT is reported that the United States Exploration Company of London have about decided to close the deal for the purchase of the Amador Queen mine in Amador county. The price is said to be $150,000.

THE U. S. Government is establishing a military telegraph system in southern Arizona in the part most exposed to the attacks of renegade Apaches and where there is a number of exposed mining camps.

IN addition to the precious metals, Colorado mines produced in 1895, 94,222,258 pounds of lead, worth $2,955,000; 8,245,494 pounds of copper, worth $877,492; coal to the value of $5,800,000 and iron to the value of $3,150,000.

THE Rockefellers and other Standard Oil people have been making examinations of properties in different districts in Utah for some time past, and are reported to have made some purchases in Mammoth and Clifton.

AN English company has secured a bond on the St. Peter-Martin properties at Jerome, Arizona, at $100,000, and it is reported that W. A. Clark, president of the United Verde mines has purchased the Cliff copper mine.

A FORCE of men have been taking ore out from under the Hotel Victor, in Cripple Creek, where the vein crops out. It is said to run all the way from $250 to $600 per ton. The vein was exposed where the street was graded.

IT is reported that the new owners of the Chino ranch in San Bernardino county will soon build a wagon-road that will tap a large bed of asphalt. Near the asphalt deposits, it is claimed, are oil fields, and arrangements are being made to sink.

THERE has been a large increase in mining news from the State of Nevada of late, particularly as to the investment of outside capital in opening up mines which have long been idle and in putting in new mills and plants for working ores by improved methods.

THE number of stamps in the mills of the Rand in South Africa on July 30, 1896, was 3095. The mines at present milling are expected to increase this number to 3700 by June 30, 1897. Besides this, many new companies are expected to bring up the total number to nearly 5000.

As to the probable output of Cripple Creek for 1896 the Colorado Springs *Mining Investor* says that conservative estimates place it at $10,000,000. During the first eight months of the year the total was not over $5,500,000, but it is claimed that the monthly output is now over $1,000,000.

THEY have a man with a divining rod in the Black Hills who is persuading many of his ability to locate ore bodies. What has become of our old divining rod man? These should be good times for him. There are enough credulous people even among the miners who would give him a good living.

THE United States Debris Commission has begun work on the Yuba river, between Marysville and Deguerre Point, to keep the river in its old channel by the construction of jetties, or wing dams, along the course of the river. A brush dam of considerable proportions will be built at the head of the channel.

IF the proposed scheme to build a large chlorination and lixiviation works on the bluff northeast of the university is carried out, it will be the greatest enterprise in the mining history of Boulder county, says the Boulder, Colorado, *News*. It is said the buildings will cost $150,000 and be capable of treating 100 tons per day.

IT is learned, although Mr. Wilson is reticent on the subject, that he has a mine worth millions located within a few miles of Prescott, and that he has just refused an offer of $10,000 for it.—Albuquerque Citizen. There is nothing very remarkable about a man refusing a $10,000 offer for a mine worth millions.—Arizona Journal-Miner.

DURING the past eight years, and principally in the last four years, fifty-two companies in the Rocky mountain district alone have installed electric power machinery for mining and ore reducing purposes, compaising 62 generators, aggregating 7988 kilowatts, and 135 motors, aggregating 4816 H. P., operating every variety of mining and milling machinery.

W. A. CLARK about a month ago bought an interest in the Mayflower mine in the Tobacco Root range, Montana, and within two weeks took out $100,000. The ore of the district is of a peculiar flinty character in quartzite, limestone and dolomite. In rock which assays from $400 to $600 a ton in gold, not a speck of gold can be seen with a magnifying glass, and crushing and panning will not yield a single color.

A NEW development company has just been formed in this city to utilize the invention of Prof. Kimball, who, by his magneto-electric batteries combined with his psycometric talent, claims that he can read the mineral formation and locate the metalliferous veins and the rich ore bodies therein as easily as a surgeon can now by means of the X ray locate a metallic substance in the human body.

THE biggest timbers ever seen in Montana are being received at the mines of the Anaconda company in Butte, says the Anaconda *Record*. They measure 2 feet square and in length extend all the way from one to three flat cars. These timbers come from Tacoma and are used as gallows frames for the new hoisting plants that have been going up at the company's mines during the last six months.

WE have repeatedly called attention to the extensive deposits of sulphur near the Colorado river in Lower California, and that capital should not jump at such an opportunity is difficult to understand, especially when the recent sharp advance in the price of sulphur is considered, says the *Lower Californian*. The opening of these mines would very materially affect the operations of the Anglo-Sicilian Sulphur Trust.

THE latest reports from Leadville are to the effect that a proposition from the Miners' Union to declare off the strike, providing the men were reinstated, was submitted through the Governor of Colorado to the mine managers and was unqualifiedly declined. Nine of the managers claim that the only condition on which the miners can go to work is to declare off the strike and depend on their own good behavior to get back.

IT is reported that the Venezuelan question will soon be settled. If it so turns out that the English obtain a good slice of the disputed territory there will doubtless soon be considerable mining activity in that country. Before President Cleveland issued his manifesto several English syndicates had obtained concessions and prepared to send in exploring parties to look for mines, but gave that up pending settlement of the dispute.

THE Homestake mine in the Black Hills, South Dakota, is receiving a good deal of attention of late through the report of its sale to the Exploration Company of London. As yet no definite announcement of a sale has been made by authorized parties. However, the property has been examined by experts for the London syndicate, and it is probable that other examinations will be made before a decision is arrived at. The Homestake has paid in dividends a trifle less than $6,000,000.

ACCORDING to a report of the State Government of Sinaloa, Mexico, there are in operation six concerns of the first order, which reduce 144,000 tons, at an average of $30 a ton, making an annual product of over $4,300,000; ten concerns of the second order, which reduce 48,000 tons, at $50—a total annual product of $2,400,000. There are besides a number of other concerns of which figures are not given. It is estimated that 5000 men are employed, and the mineral output already exceeds $8,000,000, and is rapidly increasing.

AT the Old Faithful mine in Montana the men, fearing that they would not be paid their wages, took possession of the property and locked up the superintendent as hostage. Finally, after the sheriff had locked up most of the men, terms were made by which they were to receive all the gold taken out until paid. It is only a little over a month since the Associated Press reported the discovery of ore, and plenty of it, too, worth $150,000 a ton—"not picked ore, either." There must be a great deal of money owing the miners for wages.

IN the Dominion Parliament on the 16th of September Mr. Bostock moved "that in the opinion of this House it will be in the interest of immigration and the development of the Dominion that the Government should collect, through the Department of Agriculture, all the information possible with respect to the mining interests of British Columbia and the other provinces of the Dominion, and distribute it." Our Government might take a lesson from Canada. The hearty support given to the mining interests of British Columbia by the Dominion Government has done much for the rapid development of the mines.

THE news of the probable suspension of work at the famous Drum Lummon mine near Marysville has been received with genuine regret in Butte, says the *Inter-Mountain*. The Drum Lummon mine was discovered by Thomas Cruse of Helena late in the 70s, and the controlling influence was sold some time later to an English syndicate. Mr. Cruse retained a small interest until a few years ago, when he disposed of all his stock. The Montana company was capitalized for $3,300,000 and paid in dividends to October, 1895, the sum of $2,890,637. It is understood that a number of miners will be retained in opening up some adjoining properties.

THE Northwest Mining Association held its annual meeting at Spokane, Washington, last week. Among the important questions brought before the convention were the establishment of a department of mining in the Federal Government, the mineral lands upon railroad grants, the erection of a permanent building for the association, and the building of a home for disabled members. The great increase in the mining industry in the northwest during the past year was the cause of making the meeting a very successful one. G. B. Dennis was re-elected president of the association; General A. P. Curry, vice-president; L. K. Armstrong, secretary, and J. C. Warefield were all re-elected.

THE fact that the British Association for the Advancement of Science will hold its summer meeting for 1897 in Toronto has called out from Canada a proposal that a joint meeting, or meetings, shall be held in the Dominion in which the American Institute of Mining Engineers, the British Iron and Steel Institute and the different associations of mining engineers in Canada and the Federated Institution of Mining Engineers of Great Britain are asked to join, says the Rossland *Mining Review*. In case the proposition is accepted arrangements will be made for a number of trips and excursions which will enable the visitors from abroad to study for themselves the mineral resources of the Dominion.

THE United States Geological Survey, in pursuance of its policy of making examinations of new mining districts, some six months ago sent to the Yukon in Alaska to examine the gold fields there J. E. Spurr, H. C. Schrader and H. B. Goodrich, who returned last week. In speaking of the country, one of them is reported as saying: "We examined all the gold bearing gulches of the Yukon river down to St. Michaels on the coast. Only placer mining has thus far been attempted in that region, and a good deal of gold is being taken out. The product is sure to increase year by year for some time. I do not know of any larger placer mining district in the country than that. A mineral belt similar to the so-called mother lode of California runs across that whole country in a northwest direction, and along it there are deposits in distinct and different formations."

A CORRESPONDENT of the Oroville *Register* writes: "The parties engaged in business in this town do not seem to realize the importance of sustaining the Miners' Association. There is not a man in this town who is not benefited by the mining interests, no matter what his business or occupation. Therefore, anything that promotes the mining interests helps him. Now, just think for a moment: if the mining association is allowed to dissolve, will it tend to benefit or injure this town? When capital comes to this coast looking for mining investment, if any inquiry is made about Butte county, they will be told that the county did not even have ambition enough to sustain its miners' county association, and they, the capitalists, will draw their own inference from that fact, which will not tend to the benefit of Butte county."

THE Sierra County Miners Association at its annual convention last week decided to ally itself with the State Association, and chose the following delegates to the State Convention: J. M. Harper, C. P. Gale, Paul Meroux, H. W. Orear, J. W. Orear, H. H. Squire, John Scott, S. F. Purdy, F. R. Webe, Ed. F. Webe, T. L. Ford, L. F. Byington, W. H. Byington, Louis Rosenfeld, M. W. Mather, J. O. Jones, E. A. Meily, F. W. Page, Jas. McGregor, F. H. Campbell, F. W. Hanley, A. B. Moulder, Julian Sonntag, C. T. Hamilton, Andrew Carrigan, P. Van Clief, I. Copeland, A. J. Meroux, Stanley A. Smith, J. A. Vaughn, J. F. Rowdery, Dan T. Cole, M. H. Mead, Henry Kingdon, A. Westall, H. Spaulding Sr., W. F. Eschbacher, John Costa, W. J. Holmes, T. H. Crossman, S. Wiggins, P. R. Gardner, J. M. Haven, I. T. Mooney, Geo. D. Gray, Giles H. Gray, Thos. E. Haven, J. H. Hickox, W. S. George, Thos. Kirkpatrick, G. W. Hughes, C. C. McIvor.

LABORERS in South Africa bear relations to their employers that are somewhat different from those in this country. The South African *Mining Journal*, speaking of a meeting of the mine managers at which the maximum wages was fixed, says: "Resolutions were unanimously passed approving of the scheme of classification of the maximum wages; approving of a uniform method of governing compounds, and providing that each native shall put in nine hours' actual work per day in the mine. This latter resolution does away with the system that has hitherto been practiced, under which a boy has, as a rule, been allowed to leave off work on having performed a certain duty, such as drilling a hole of certain depth, and is a very great step in the right direction. Under the old system the boy who was active, capable and hard working had no rise in wages to expect as a reward of his capability: he could merely get through his stated task more quickly than his neighbors, and so have more time on the surface for loafing or drinking. Indeed, a good many compound managers have believed that the drinking boys in the compound were in many instances the best workers. The old system, now to be abolished, explained this state of things; the best workers had the most idle time on their hands. Under the new system, if properly worked, the best workers will work as long as their less competent neighbors, but the scheme of a maximum scale of wages should adjust this matter in such a way as to compensate good workers by increased pay, instead of by allowing them an extra spell of idleness, a step which is clearly a good one. In the matter of the pass regulations compound managers are already complaining that, owing to the inertness of some of those who ought to be most alive to the importance of maintaining the regulations strictly, they are not producing the effect which was hoped of them, and that in fact the new pass law is failing in its main object—that of preventing natives from running away. Now, it was definitely arranged, at the above meeting of mine managers, that the boys on each mine should be given notice through their compound manager, at 6:30 A. M. on the first day of September, that the reduction of native wages will come into force on the first of October; and, by order of the council, this resolution was advertised in the local papers, and every manager was requested to obtain the necessary authority from his company to enable him to carry the resolution into effect. All along the reef, therefore, at the stated time, the announcement was made simultaneously, as directed. It was expected that there might be mutinies among the boys, and troubles were vaguely expected. Everything, however, as a matter of fact, passed off well. On a few properties the boys perhaps wavered for a few hours, and drank rather more than usual, but no disturbance or outbreak occurred."

A New Gold Saving Process.

Written for the MINING AND SCIENTIFIC PRESS by DR. P. LANGHAMMER.

Scientists, especially practical miners and metallurgists, agree that gold is one of the most widely distributed elements known, for not only does it exist in the earth, but is also found in the water and in the very air that we breathe, in greater or less quantities. It exists, however, in such a minute state of division, or, rather, in such an impalpable form, that all attempts to extract it by mechanical means have been failures; but chemical processes have at last been discovered that enable one to successfully cope with the problem, and, where gold exists in anything like paying quantities, its successful extraction is now secured.

In 1863 I discovered that immense quantities of this fine, impalpable gold were to be found at the foot of the Vaal mountains in southeastern Africa, where the Crocodile river enters into the flats near the Marquez or Delagoa bay, and in 1877 I found the same thing in South America, the republic of Colombia, State of Panama, along the Rio Chagres, Rio Obispo, Rio Magdalena, etc., on the Pacific slope, a few miles below the old city of Panama, in many places in Mexico, and, lately in 1895, on the Pacific coast of the Olympia peninsula, in the State of Washington.

At any of these localities one may take a miner's gold pan and fill it half full of sand, without having any idea that it may contain minute free gold, and, on adding water, stirring carefully and then setting the pan in the sun, a thin film of free gold will be found floating on the surface, the reflection of which will leave no doubt as to its character; siphoning the water off and sun-drying the residue, it will be found that it is covered by a thin film of metallic gold, which is clearly visible under the microscope. This gold can be saved in its larger part by chemicals, but not by mechanical means. It is safe to say that in all stamp-mill operations, where water comes in contact with the auriferous material, this minute gold will be inevitably lost—no mechanical appliances can save it.

I have made a careful study of this problem for the last thirty years and am convinced that only by chemical means is any solution possible. Potassic cyanide, I have found, is the surest and best solvent, and as early as 1877 I used it with great success in South America. I was then operating on auriferous "raw" iron pyrites, which carried $19 in gold per ton, and succeeded in saving 72 per cent of the gold. After applying strongly-heated air to the pulverized material, I found that the loss only amounted to 8, instead of 28, per cent. After years of experimenting and of careful observation, I have found that in auriferous sand, where the gold is carried in very minute particles, these particles of gold will be found in films enveloping nearly every particle of the material. By heating this material under constant agitation, these films of gold can be detached and made readily available for treatment by chemical solution. The same is true of auriferous ore where the noble metal exists in a state of fine division.

I have applied for and been granted a patent which involves this principle, and the main point in this process is that the gold does not and must not come into contact with water until it reaches the chemical solution, and this chemical solution should be used over and over again. Therefore, we have to deal with two separate and distinct processes: First, the treatment of auriferous sand, and, second, the treatment of auriferous and argentiferous ores. In the first case nature has done much of the mechanical work and the material comes to hand already crushed. In other words, we have sand and gravel, and, in consequence, no expensive milling machinery is required.

The material is dumped into a hopper provided with a grizzly, so that any large gravel may at once be separated and carried away. The finer material is then conveyed by an automatic feeder to a large unperforated drying screen, supplied with the necessary drying hot air pipes which are in connection with a suitable heating apparatus. The material is then passed through sizing screens in which it is further dried, if necessary. These screens are provided with rigid interior spirals with projecting teeth, with a view to keeping the material in constant agitation and friction, the object being to loosen and detach any minute particles of gold from the particles of sand.

From the screens the material passes into ore bins which are kept perfectly dry and "dust tight." The various sizes of such rich auriferous sand are separately treated with cyanide solution in percolation tanks. Any material too coarse to pass through the last screen is passed on through to the dump, unless it is found that such material carries coarse gold, in which case it is directly concentrated and the gold smelted. After the material has been thoroughly treated in the percolation tanks the solution is then passed through electric precipitation boxes. Plates of sheet iron are used as anodes and plates of lead as cathodes. The gold contained in the material is deposited in metallic form in a thin film on lead plates, which film becomes thicker the longer the process is continued. Zinc precipitation boxes may be used, but the electric process is considered by me to be more certain and in the long run to give the best results.

It will be noted that with this process very little water is used, as the solution is used over and over again, thus insuring against loss; for, after passing through the precipitation boxes the solution is run off into sump tanks and is then pumped back into the storage tanks to be used again.

With any auriferous and argentiferous ores the process is much the same, except that a grizzly, crushers and pulverizers must be used. The main point to be observed is that the pulverized ore must be carefully sized. Slime should be avoided in ordinary treatments. So far, copper and lead carbonates are the only ores that cannot be successfully treated.

The works erected for the Wyandotte M. M. & G. Co. of Chicago (see illustration page 313) are situated in the northern part of Okanogan county, State of Washington, nearly opposite Mount Chapaca and four miles from the British Columbia boundary line. Their capacity is sixty tons daily, which can be easily increased to one hundred tons, and the ores to be treated are of various kinds; therefore, a somewhat more complicated arrangement of machinery than outlined above was necessary.

The company owns seven claims, of which three have been developed and will be operated to furnish ore to the works.

The Oro Fino has a vein 4 feet thick of dark quartz containing iron pyrites only, with a strong dissemination of graphite in layers. It averages about $8 in gold per ton, and preliminary experiments made on a very large scale showed that the process will save 92½ per cent of the gold. The ore from the Vulture and Wyandotte mines consists of a white quartz disseminated with fine galena, iron and copper pyrites and some zinc. It runs an average of $14 in gold per ton and 89 ounces of silver. With this process 87½ per cent of the gold and 60 per cent of the silver are saved, and the bulk of the remainder is saved by subsequent concentration. It is worthy of note that in these ores it is almost impossible to detect the smallest particle of free gold, but it is there in a state of very minute division or in combination with sulphur. Should further development show a coarser grade of gold the fine gold will be saved first and and the coarser particles subsequently, as well as the base metals, which will be concentrated and then smelted into lead bullion or copper matte.

The machinery used consists of a 60 H. P. boiler and a Fisher automatic high-speed engine; a Morris No. 4 crusher and a Ball pulverizer, all run by a suitable system of shafting. A 125-light dynamo supplies light to the works, mines and dwellings, and a 1½ kilowatt, six-volt dynamo supplies the current for the electric precipitation boxes.

There are eight tanks, 20 feet in diameter and 5 feet deep, and two sump tanks, 20 feet in diameter and 8 feet deep. Two of these tanks are used for storage purposes and contain respectively strong and weak solutions.

The ore, being directly delivered from the mines, passes over a grizzly and the finer material is sent direct to the pulverizer, the coarser ore going to the crusher and is there pulverized. The fine stuff is then sized through screens and passes into ore bins which are perfectly dust-tight. From these bins the material goes to the percolation vats, where the solution percolates through the mass upwards from a system of perforated pipes in the bottom of each tank. Strong solution is first used, and after this has been drawn off a weaker wash solution is then introduced. Both of these solutions are then passed through the electric precipitation boxes, and then go to the sump tanks, pumped up into the storage tanks to be used over again after being brought to the proper strength.

By this method very little water is required, only enough to make up the loss by evaporation and soaking into the ore.

In conclusion, I wish to emphasize one point, and that is that by this process every effort is made to save the fine gold first, for there is no difficulty whatever saving the coarser particles afterwards.

Extent of Canadian Gold Fields.

The Canadian *Mining Review* for September says: "British Columbia is not the only gold producing province in the Dominion, as one might suppose. There have been years when steady-going Nova Scotian stamp mills have surpassed it in output. Quebec, too, has gold mines of promise—placers, like most of the producing mines of the West; but, perhaps of all the provinces, Ontario has the widest diffusion of gold, for it has been found here and there from Madoc to the Manitoba boundary, a distance of more than 900 miles in a straight line, and in its western portion the locations where gold has been proved to exist number hundreds."

The Cyanide Process in the United States.*

By GEORGE A. PACKARD, Boston, Mass.

(*Condensed.*)

The process has been applied on a large scale only to rather low grade, highly siliceous ores, containing but a small percentage of base metals and having their value principally in gold. In fact, the cyanide process has a field of its own. I have been told of one instance in which cyanide competed successfully with the smelters on ore carrying as high as 4 ounces in gold, the ore being one in which the value was easily extracted to a high percentage. In the Cripple Creek district, where an extraction of 90 per cent is obtained in from four to six days, and where the smelting charges were from $5 to $7 per ton, ore running as high as $40 was in 1895 bought by the cyanide mills.

With silver ores, while some very good results have been obtained, the length of time required for treatment has usually been too long, and the consumption of cyanide too high, for the process to give economical results. There are, however, several plants in the vicinity of Tombstone, Arizona, working on silver ores. In the case of ores containing from 1 to 10 ounces of silver, in addition to a commercial gold value, the process has been advantageously employed. Thus the Golden Reward Company, in South Dakota, having certain ores containing from 1 to 5 ounces of silver which was lost in chlorination, has built an addition to the plant, in which such ores are treated with cyanide.

Chlorination is the only process the field of which the cyanide method is seriously invading. For mines located at a considerable distance from a railroad the cost of transportation of the chemicals used in chlorination has been hitherto an almost prohibitory factor; and here, at least until the use of liquid chlorine becomes a practical success, cyanide has the advantage. At the Golden Reward plant, early in 1895, they were using for chlorination about 35 pounds of chemicals per ton of ore, while only 2½ pounds were necessary for treating 1 ton with cyanide. As already observed, if there is silver present, the cyanide has the advantage that part of the silver is recovered; but, so far as my observation goes, the gold extraction is usually higher by chlorination than by cyanide.

With amalgamation, cyanide enters into competition only in the case of very finely divided gold, which is saved more or less successfully in pans. Generally speaking, ores suited to one process are not suited to the other. Thus at the mill at Cooke, Montana, there was a sudden change last year in the character of the ore. A quantity of very fine free gold appeared in a mine where a "color" had but rarely been seen before. This gold, although so fine as to pass through a 60-mesh screen, could not be extracted by the strength of the solution employed and in the length of time usually allowed on the ore there being treated, while the value of this new ore was too low to permit the use of a stronger solution (entailing larger cyanide consumption) or a longer time. To save this gold, and a little pyrites, the tails were passed over a system of riffles and blankets. A similar arrangement has since been used at one of the Florence, Colorado, mills to save the coarse gold resulting from roasting ores containing tellurides.

The treatment of low-grade concentrates has not generally proved a success, on account of the long time and high consumption of cyanide involved, and smelter rates are too favorable to make the process profitable on high-grade concentrates, save in exceptional cases.

There are at least two districts in this country where the cyanide process has proved a panacea—Camp Floyd (Mercur), Utah, and Gilt Edge, Mont. To these, Cripple Creek might be added, for the ability to sell low-grade ores has certainly aided largely in the development of that camp.

At Mercur, Mr. E. A. Schneider says "the gold occurs as a fine coating on particles of magnetic iron in limestone." The ore is somewhat porous, and the value occurs largely along certain lines of cleavage which become the lines of fracture, enabling the ore to be treated with only a very coarse crushing. In nearly all of the mines in this district cinnabar and more or less arsenic occurs. Much of it, however, is deposited on the hanging wall in such a manner that very little is sent to the mills. At the Marion mill, I was told that they sometimes retorted the "slimes" on cleaning up in order to save the quicksilver deposited on the zinc. At the Geyser mill I was told that they sometimes found arsenic as the oxide, though never enough to amount to more than ½ per cent. All of the arsenic which I saw in the district was a sulphide. It has been found that the presence of a very small quantity of arsenic in the ores soon fouls the solutions so that they cannot be titrated for standardizing; and at most of the mills the solu-

*Trans Am. Inst. M. E., September, 1896.

tion is thrown away if it becomes badly fouled.

The Gilt Edge ore contains porphyry and limestone, and is not unlike the ores of the Camp Floyd district. There are but two mills in operation here.

The ores of the Cripple Creek district are a porphyry (or phonolite), containing a fraction of 1 per cent of tellurium, some of which, as Prof. Anderson of the American Reduction Co. informs me, is combined with gold and some with iron. When the tellurium occurs in the oxidized condition, the ores are easily treated raw; but in the case of other ores a preliminary roast is required.

In South Dakota, the ores all contain a little sulphur, and in some the sulphur runs as high as 5 per cent. Both mills have found that a higher extraction is obtainable after roasting, but it is accompanied by a higher consumption of cyanide.

In general, ores containing much sulphur have given unsatisfactory results. I obtained some very good extractions in tests of small quantities of pyritic ores at Cooke, Mont., using cyanogen bromide, and Mr. H. C. Cutter obtained similar results at the University of Minnesota. Mr. Wallace Macgregor, in charge of the Congress, Ariz., cyanide mill, reports a 93 per cent extraction from ore containing pyrites, which had received but a slight roast, and which he treated with potassium cyanide alone. Mr. Macgregor, in some recent experiments on ores containing a small percentage of pyrites, found that where the ore received a thorough roast, the consumption of cyanide is decreased, and a similar effect has been noticed after roasting at the Florence mill of the American Reduction Co.

The size of ore leached varies from through a $\frac{1}{4}$-inch mesh at the Marion to through a 40-mesh at the Metallic Reduction Co.'s mill at Florence.

The vats are usually round, and vary from 9 to 26 feet in diameter and from 2 to 5 feet in depth. A few mills have all-steel tanks. In Utah many of the vats have sides of iron and wooden bottoms—a very satisfactory arrangement. Other mills have vats of pine, cypress or redwood, sometimes unpainted, but usually painted with paraffine or asphaltum paint.

The false bottoms consist of a frame of strips, or of boards, in which 1-inch holes are made, covered with jute or matting. Over this a No. 8 duck is sometimes used, especially if the tank is to be emptied by sluicing. In a few mills a gravel filter is used.

The method of leaching I find to be quite variable. The preliminary treatment includes the use of lime, caustic soda and sodium dioxide. Lime, when used, is mixed directly with the ore. In some cases the pulp is then washed with water until the lime is all washed out.

At other mills the solution is put on at once. Caustic soda is used in the same way, and also in solution as a preliminary wash. At the Commercial mill, Bingham, Utah, Mr. Stephens told me he had found that a preliminary treatment with a solution of sodium dioxide in water gave better results than either lime or caustic soda, and considerably decreased the time required for leaching.

Many mills begin the leach by admitting the solution at the bottom of the vat, until the ore is covered. The solution is then turned on top and allowed to run on at the top and drain off at the bottom simultaneously for a number of hours, the surface of the ore being kept covered. Very good results are obtained from this mode of treatment when the tanks are allowed to stand for a short time, after the pulp is covered, before the drainage valve is opened and the solution turned on top. This allows the whole mass to become thoroughly saturated and the slow drainage prevents the formation of channels. Any great depth of solution on top of the charge causes it to "pack," and an uneven extraction follows. In the Mercur district the ore is covered with solution, which is allowed to stand from thirty minutes to six hours and then drawn off. This operation is repeated from eight to thirty-five times. Here the material leached is so coarse that there is no danger of "packing." Each operation of covering takes from two to six hours. A few mills cover the pulp with solution, allow it to stand forty-eight to ninety-six hours, draw it off and wash. Many of the mills follow the strong solution with a wash of weak solution ($\frac{1}{10}$ per cent or less). This is in turn followed by a water wash, which flows through the zinc boxes into the weak solution tank, and becomes the first wash for the next charge.

A few mills warm the solution, and at one mill I found facilities for steaming the charge before putting on the solution.

The use of sodium dioxide in connection with cyanide, which is known as the Kendall process, has been adopted at a few mills. Prof. Kendall says that the better results are obtained by adding the freshly-made solution of dioxide to the cyanide solution; but many chemists claim that much oxygen is lost in this way, which is made available when the dioxide is mixed, dry, with the ore. The object of the dioxide is to furnish "nascent oxygen," which "acts on the cyanide to liberate cyanogen," hastening the reaction. My own experience with the use of dioxide has been that, in general, a greater extraction is obtained in a short time (twenty-four to forty-eight hours); but that at the end of a long time (seventy-two to one hundred and twenty hours) the extraction with dioxide is about the same as with cyanide alone.

The consumption of cyanide varies with the character of the ore and depends very little on the amount of gold and silver extracted. It varies from 2 pounds per ton, reached occasionally on Cripple Creek ores to $\frac{2}{10}$-pound on the Gilt Edge ore. The latter ore is an ideal one for the process, showing no indications of decomposed pyrites and the resulting acid compounds. Acid ores, although a preliminary treatment be given to neutralize the acid, consume more cyanide than others.

The consumption of cyanide in the zinc boxes varies with the strength of the solution, the length of time it is in contact with the zinc, and the amount of other salts in solution. Using a 1 per cent cyanide solution, and having mixed with the ore in the tanks an excess of impure lime containing alumina and magnesia, I have had as high as 3 pounds of cyanide per ton of solution consumed in the zinc boxes. Ordinarily, with a solution of 0.2 per cent KCy entering the boxes, the consumption is practically nothing. The strength rarely falls below 0.17 per cent KCy on leaving, and often shows no perceptible loss. A series of experiments made by the writer last winter indicated that the loss of cyanide in the zinc box is less when lime is used than when the acid in the ore is neutralized with soda, the excess of lime or soda and resulting salts not being washed out before the cyanide solution is added. The consumption of zinc, however, was slightly less when soda was used. This latter result was confirmed by Mr. Macgregor at the Congress mill.

The cost of "cyaniding" varies largely with the character of the ore. There are a number of mills which crush and "cyanide" ore for less than $2 a ton, exclusive of royalty paid to the company owning the patents. The lowest cost I have heard of is 85 cents a ton, at the Mercur. No company has yet been able to reduce the cost of treating tailings to the minimum reached in South Africa, 59 cents per ton; but one plant operating under exceptionally favorable conditions is working at a cost of 69 cents a ton. In general, the tailing plants working in this country do not obtain a high extraction.

There are a large number of tailing plants in the United States, especially in the southwest, where the hot, dry climate renders expensive buildings and drying machinery unnecessary. Including the output of these mills, I find that nearly 200,000 tons of ore and tailings were treated by cyanide in 1895, producing over $1,000,000 in bullion value.

Scientific Progress.

Emmens' Alchemy.

Several very reputable Eastern journals of a more or less scientific character have been for a number of weeks past giving considerable serious attention to the claim of Dr. Stephen H. Emmens that he has discovered a method for transmuting silver into gold. The London *Industries and Iron* pays its respects to Dr. Emmens as follows: "Dr. Emmens winds up this remarkable emanation with the declaration that he has already made forty ounces of gold from sixty ounces of silver, and that the metal responded to every test to which the United States Government assay office subjects the gold offered there for sale. In regard to the proceeding, where it will be seen Dr. Emmens claims not only that he can transmute silver into gold, but that he has actually already done so, the next step which would naturally follow the publication of a claim whose validity would be of such profound importance would be the production of some kind of proof that the claim was true. This is usually the difficult part of the matter in discoveries of this fundamental character; and Dr. Emmens' forms no exception. He is quite prepared to furnish infallible demonstrations of the bona fides of his transmutation process, but is unfortunately deterred by moral considerations which, if genuine, do him honor. Says he: 'I am of opinion that if such absolute, uncontrovertible proof were made public at the present time the effect would be to strike away the foundation of all commerce, and thus to cause widespread confusion and ruin to prevail.' This may or may not be so. The case, however, is that Mr. Emmens states publicly that he can convert silver into gold, but declines to attempt to prove his assertion, because if he proved it great confusion would be created. The obvious inference is that Dr. Emmens does not expect his own plain statements to be believed—rather a humiliating position for a scientist to voluntarily accept. He should either have accompanied his public declaration with the offer of proof, or held his tongue altogether. Scientific men, however, will not be inclined to place much credence in a process in the account of which such a farrago as the following is included. Says Dr. Emmens: 'What we use is mainly energy in some of its forms, such as heat, electricity, magnetism, gravity, cohesion, chemical affinity, X rays (!) and the like.' He further gravely informs us that 'energy is cheaply produced nodwadays, and may be had in any desired form by the combustion of coal.' We think that this piece of information might have been dispensed with, considering the ample margin there is for disclosures of a more interesting nature. There is no absolute impossibility in the feat which Dr. Emmens claims to have performed; but until he chooses to afford some practical proof, or at least some specific details of his procedure, must perforce earn his notoriety, or celebrity, at the expense of his character for veracity."

THE farmers of north Holland, says a correspondent of the *Gas World*, have come into possession of a very interesting source of lighting. About forty years ago borings for water in the polders around the Haarlem lake, at farms below the level of the surrounding sea, brought up inflammable gas; but, as this gave no light, it was neglected. Now, however, this gas is being systematically bored for, and it comes up mixed with sweet water, making this water effervesce. The effervescing water is brought under a gas holder, and the gas is liberated while the water flows on. About 6 cubic feet per hour are thus collected from each boring, and the singular result is that many outlying farms, away on the polders of north Holland, below sea level, are brightly lit up at night by incandescent burners.

A NEW source of vanadium compounds has been found on the South American Andes. On one of the high plateaus a mine of anthracite has been located, which, when burned, leaves an ash containing vanadium and silver. The vanadium is now being extracted for use in making aniline black and coloring porcelain.

A STATISTICIAN has learned that the annual aggregate circulation of the papers of the world is calculated to be 12,000,000,000 copies, says the *Northeastern Lumberman*. To grasp any idea of this magnitude we may state that it would cover no less than 10,450 square miles of surface, that it is printed on 781,241 tons of paper, and, further, that if the number 12,000,000,000 represented, instead of copies, seconds, it would take over 333 years for them to elapse. In lieu of this arrangement, we might press and pile them vertically to gradually reach our highest mountains. Topping all these, and even the highest Alps, the pile would reach the magnificent altitude of 490, or, in round numbers, 500 miles. Calculating that the average man spends five minutes reading his paper in the day, we find that the people of the world altogether annually occupy time equivalent to 100,000 years reading the papers.

THE late Dr. Brown Goode made the following comparison in a report of the United States National Museum: "There is not a department of the British Government to which a citizen has a right to apply for information upon a scientific question. This seems hard to believe, for I cannot think of any scientific subject regarding which a letter, if addressed to the scientific bureaus in Washington, would not receive a full and practical reply. It is estimated that not less than 20,000 such letters are received each year. The Smithsonian Institution and National Museum alone receive about 6000, and the proportion of these from the new States and Territories, which have not yet developed institutions of learning of their own, is the largest. An intelligent question from a farmer of the frontier receives as much attention as a communication from a royal academy of sciences, and often takes more time for the preparation of the reply."

TECHNICAL society work has never received nor merited such appreciative attention as at the present time. Changes in processes and methods, wastes and economies in production, and the extension of services and uses are being so ably discussed, and the methods for giving publicity are so numerous, that what is said by the Western Foundrymen's Association of Chicago one week is heard in London the next. The world is wiser and better to-day for such associations, and the fraternizing effect the world over is vastly enlarging class scope. The annual congresses of American technical societies are becoming almost historic in their importance, and those to be held between now and the new year embrace interests that are a vital part of the industrial integrity of the United States.—Chicago Journal of Commerce.

THE spontaneous combustion of coal on ship board is attributed by Emanuel Stauber of Hamburg to a combination of causes, including the admixture of air and moisture with the gas exhaled by coal, together with the heat generated by the internal friction of the heaps from the rolling of the vessel. This has led him to patent a method of ventilation having the threefold object of drying the coal, removing the evolved gases, and preventing the mass from moving about. His plan is to perforate the floor of the hold and to set up a pair of perforated walls down the center, thus forming an air space in the form of an inverted T, which is connected with a double ventilating cowl on deck. In addition to the partition walls a number of movable perforated pipes are to run from the central shaft transversely through coal at different heights.

Mechanical Progress.

A Hot Blast System for Copper Matting and Silver-Lead Furnaces.

The following is from advance sheets of a treatise on the above subject by Mr. J. W. Nesmith, president of the Colorado Iron Works:

The cut herewith presented illustrates a system of heating air for silver-lead blast furnaces, copper matting and pyritic furnaces and consists essentially of a suitable chamber through which the air passes on its way from the blower to the furnace, and within this chamber in the atmosphere of the air blast an open fire of gas or oil is kept burning, the heat from which is absorbed by the passing air blast and carried thence into the furnace. With these conditions some very important considerations are involved. The products of combustion in the stove mix and go forward with the heated air into the smelting furnace, thus reducing the proportionate amount of oxygen blown in by the amount consumed in the stove. Carbonic acid gas now becomes a constituent of the air blast in proportion as oxygen has been consumed in heating it; but as the ultimate value of oxygen consumed has been utilized in heating the air, and that heat has gone forward into the furnace, it follows that just so much less oxygen is required in the furnace for the purpose of oxidizing fuel for heat production there and no loss is sustained in the attenuation of the air by the amount of carbonic acid gas, which mixes and goes forward with it. The aggregate amount of carbonic acid gas at the tuyere zone has not been increased, nor has the aggregate value of oxygen supplied with the air blast by the blower been diminished.

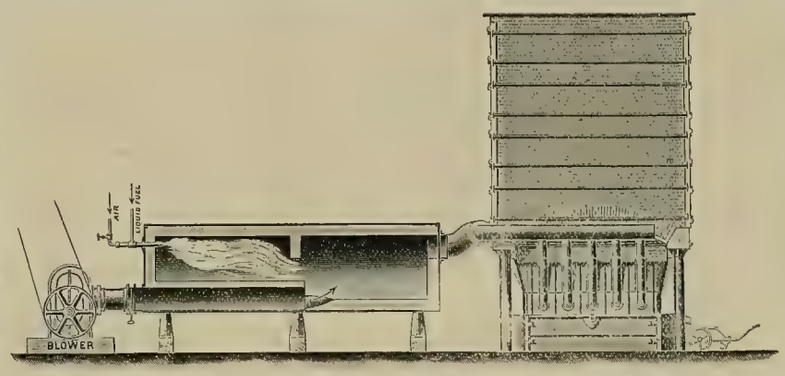
Hot air, when attenuated in the proportion of oxygen it carries by the amount of carbonic acid gas produced in heating it, does not tend to concentration of combustion and resultant unduly high temperature at the tuyere zone, which is to be avoided in copper matting or pyritic and lead smelting. Conditions at the incandescent zone above the tuyeres for oxidation and reduction are controlled by volume, temperature and pressure of blast with reference to cross section of the furnace at the tuyeres, character of the material being operated upon, and end results to be accomplished. In the use of hot air, provision must be made in tuyere area to accommodate and allow the passage of its vastly expanded volume. If the air pipes and tuyeres are not proportioned to it, then necessarily at a given pressure of blast there may occur a localization of combustion simply by reason of the limited amount of oxygen supplied through them, which at once combines with the first carbon or other fuel with which it comes in contact, leaving less or none for other fuel in the same zone and above.

Heating the air blast, by reason of its vastly increased volume, tends to facility of distribution and not to localization of combustion. Pure oxygen blown in at the tuyeres would produce most violent local combustion and most intense heat. Nature attenuates oxygen by the admixture of a trifle more than four times its volume of nitrogen, and the product becomes air and is susceptible, physically by well-known means, of a much wider distribution and contact with the material and a corresponding distribution of resulting combustion in the tuyere zone. Increasing heat invests oxygen with the property of accelerating energy and intensity which would tend, if blown in hot, to violence of reaction with carbon, sulphur, iron, etc., concentration or localization of combustion and resultant excessively high temperature, were it not for the counteracting factor that nature again provides in the expansibility of gases under heat which has the same material effect of an attenuating or thinning down of the air by increasing its volume, components remaining unchanged, the increased energy of its oxygen by reason of heat, being counteracted or compensated for by its expanded volume, and hence facility of distribution, prevents undue local action. The reactions peculiar to the zone of fusion do not, however, occur until the air blown has reached the temperature of that zone and the oxygen has hence acquired its extreme energy, therefore the only effect of heating the blast on the action of the furnace is to make uniform action possible where it enters the furnace by eliminating much of the cold otherwise carried in by the air blast and circulated or distributed irregularly and without control. When the air is heated to 553 degrees F. from 62 degrees normal atmosphere, its volume has been doubled and the facility for its thorough distribution and exposure throughout the tuyere zone is doubled, and so on proportionately to 1045 degrees it is trebled and to 1535 degrees where it has four times its original volume. In the exact proportion that a given quantity of air is increased in volume by heat, the practicability of its thorough distribution and contact with every atom of exposed material, and hence of uniformity in degree of combustion at the zone of fusion and in the desired conditions throughout the other auxiliary zones respectively, is realized.

If comparatively high blast pressure through tuyeres relatively small, carrying no air in excess of that used for combustion at the tuyere zone, then there occurs a localization of combustion and consequent heat, and all material within that zone is quickly melted down with little change in grouping of constituents, while such carbon monoxide evolved as may escape oxidation there absorbs oxygen from the oxides in the hot zone above and thus reduction results. With large volume of air blast at lower pressure, the oxidation of fuel is more gradual; the action at the tuyere zone is less intense, and while a melting temperature must be maintained at that point, a surplus of heated air must pass on to the next layer or cross section above, where, by thorough exposure for sufficient length of time and in the presence of adequate heat, oxidation takes place more or less rapidly, depending on character of material operated upon, and the equable proportioning of the conditions named above.

Hot wind does not necessarily tend to concentration of temperature and rapid smelting, though it makes either the one or the other, or both, possible, when pressure temperature and volume are under control to adapt all to size and shape of furnace and character of ore being smelted. Cold, purely as cold in the air blast introduced for the purpose of producing any modifying effect on a zone of the furnace where incandescence is a normal and necessary condition, is an absurdity.

A part of the air sent to a blast furnace is for the purpose of generating heat by the burning of fuel to raise the temperature of material within the furnace to a point at



HOT BLAST STOVE FOR SILVER-LEAD SMELTING AND COPPER MATTING.

which it is possible for the desired chemical reactions to take place rapidly, and further to melt such material when it reaches the tuyere zone, while another part is required for the oxidation of fuel necessary for those reactions, or else for its oxidizing effect higher up in the furnace on ores carrying sulphur, iron, etc. There are large proportional areas, especially in the neighborhood of the tuyeres, in every cold blast furnace in which the desired reactions cannot take place because the blast keeps these areas too cool to admit of them. Proportionally as the air is sent hot into the furnace these cool areas are reduced of size and in far greater proportion is the capacity and the efficiency of the furnace increased. Zinc crusts and other accretions of kindred nature obtrude less difficulties to combat when not complicated by the presence of cold inactive spots produced by the cold of the blast. A pound of carbon requires 11.6 pounds of air for its consumption, and conversely for each pound of carbon that is saved from burning in the furnace by burning it in contact with the blast before it reaches the furnace, the cooling influence of 11 6 pounds of cold air is kept out of the zone of intense heat, as much cold in the air blast to be overcome by heat to be developed from each pound of carbon as would be required to melt 32 lbs. of pig iron from atmospheric temperature, and it is by far better to relieve the furnace of at least a part of the duty of heating in its most vital part such enormous quantities of air to burn fuel for the production of heat that may more efficiently and cheaply be produced outside and carried in with the air blast.

Hot air is a most potent factor in facility of control in furnace working Eliminating the element of cold from the air blast removes the one unmanageable factor in blast furnace smelting. If the current of cold air could be kept constantly impinging on glowing coke, then to overcome its cooling influence would be only a question of fuel added; but it is not so; it is unmanageable because the course or direction of the air when it enters the furnace is largely determined by the dark areas or patches of cold material, rendered so by the cold of the air blast and against which it impinges.

If in any particular zone of the furnace a given condition of temperature, oxidation of fuel and incandescence is desirable, then that condition is desirable in the whole of that zone, and the cooling in spots and patches in cross section by forcing a blast of cold air into it curtails the area and the efficiency of that zone, not only by the amount in relative proportion of those abnormally cooled spots or patches to the whole zone under consideration, but by far more than this, for they lie there in the way of the blast, obstructing and preventing it from circulating freely throughout the incandescent zone, which it necessarily should do for the requisite supply of oxygen to each and every individual inch in that section, and not only is the room they occupy lost absolutely and to be deducted from value of cross section, but their adverse effect on its operation by deflecting the blast upward or downward, anywhere away from where it is needed to where it is not needed, is still more serious, for no possible good but much harm must come as a result of blast blown against cooled masses of furnace material and deflected thence upward or downward or athwart into material from which heat is obstructed by the cool areas. It is only the air that gets around these cooled spots in some way and into the burning fuel, and is then heated, that does effective duty.

An illustration from an old chemistry text book applies, to-wit: a candle is blown out with a breath because the wick and the wax are cooled and the oxidation of the carbon cannot go on. Submit it to a blast of air as hot as the flame of the candle, and it will not be blown out, but will still burn.

In like manner and for like reason combustion may be stopped and the smelting operation ended by a very violent blast of cold air in a furnace burning carbonaceous fuel, and it is for this reason that very large furnaces cannot be operated with cold blast. Whenever the furnace is so large that the blast pressure must be increased to several pounds in order to permeate the center of the whole mass of furnace material at the tuyere zone to maintain combustion there, then the excess of cold extinguishes the fire, blows it out, as it were, in continually widening areas in the neighborhood of the tuyeres, where it is introduced, and for distances inward greater and greater as blast pressure is increased, but in patches or spots only of greater or less area, until the center is reached and cooled so much as to stop the smelting operation all along the center line; the half-melted mass of unsmelted material cools more and more, growing larger and larger until it is finally connected here and there with the cold patches between the center and the sides, and now excessive irregularities are culminating in a frozen-up furnace, often solid at the center while yet partially open along the sides.

Air is delivered into a blast furnace at its hottest part—the zone of fusion—the tuyere zone. It follows that to perform its functions its temperature must first become the same as the temperature of that zone. It is not to be admitted that any other than that temperature adapts it for its offices there, else why blown onto that hottest zone, or else why has that zone such temperature? It is not for a moment to be supposed that some other, some lower, temperature suits the air to its duties as a factor in furnace operation; that it may be better blown in cold and allowed to warm up to its work, and that it could perform its office efficiently and reliably when submitted to such fortuitous conditions in its warming up, one part of the air blast impinging on or blowing into the fierce heat of glowing fuel, where the excess not required to support combustion at that point is heated instantly to the highest burning temperature, possibly 4000° or more, oxidizing rapidly any reduced lead with which it may come in contact; another part landing against some cold, dark spot and thence deflected against some other cold, dark area, thence dodging around until it does get into the heat somewhere, often far above the proper smelting zone, and having finally acquired the heat necessary, it performs its offices in conjunction with fuel at that point, producing heat and setting up a temporary smelting area above the normal one. Thus is the proper smelting zone robbed of a part of the air necessary to its appropriate reactions and further chilling ensues, while the smelting zone is extended upward and rendered inefficient throughout its whole extent. The air must reach the temperature at which the desired reactions take place before it can become a factor in these reactions, and hence the proper temperature of all the air in any zone of the furnace is that at which the reactions peculiar to that zone take place, and because air blown into the zone of incandescence can only perform its appropriate functions there when at the temperature of that zone, the nearer to that temperature it is when it reaches there the less disturbance and irregularity it will create in that vital section.

Hot blast contributes to support the combustion of carbonaceous and other fuel, as sulphur, etc., with a minimum of oxygen supplied, i. e., the hot blast and fuel are drawn upon most for the necessary smelting reactions and least possible for heating per se. Heating the blast promotes regularity of heat and of chemical reaction by promoting uniformity of conditions throughout each individual section of the furnace, especially in the zones of incandescence and fusion where the most active changes are taking place, reduction or oxidation predominating, as the case may be, both in that zone and above. Reducing the amount of air necessary to be forced into the furnace to burn fuel for the promotion of heat, in that proportion is reduced the probability of excessive lead oxidization in silver-lead smelting, and it does not in the least tend to increase oxidation of lead by reason of the heat it carries with it, so long as initial blast temperature is below the necessary temperature of the furnace at that zone where it enters. On the contrary, by reason of the uniform conditions made possible and promoted by the heated air blast in the various zones of the furnace respectively, especially that at the tuyeres and that one of incandescence next above the tuyere zone, the probability of excessive oxidation of lead is much further reduced. It utilizes a less expensive fuel for the production of that part of the heat that may better be carried in by the blast, and it realizes the full caloric value of that fuel, sending the whole resultant heat into the furnace. Because the blast is heated it does not follow that the furnace need be, or would be run hotter than is common or desirable. Hot blast does not necessarily involve increased temperature in any zone of the furnace. Incandescence at the tuyere zone where the air blast enters, is a necessary condition of every blast furnace, but the temperature of the heated blast being always below that of incandescence, the heat of that zone and of the whole furnace is within easy and accurate control.

In matte smelting of sulphide ores that require previous partial roasting and where carbonaceous fuel is used, the tendency is to reduce iron oxide and sulphurous acid by excess of carbon monoxide and to produce a poor matte, because the carbon monoxide in the first instance robs the FeO of its oxygen to form carbonic acid gas, thus robbing the slag of the iron needed there and sending it to the crucible to burden the matte, and in the second instance the sulphurous acid which would otherwise escape by the chimney is robbed of its oxygen, thus producing sulphur and sending that also to the matte. The less carbonaceous fuel necessary to be burned in the furnace, other conditions being right, the less imminent become these undersirable reactions, and hence the more of the necessary heat that is generated outside of the furnace and sent in with the air blast, the more favorable are conditions in this view of the case to a higher percentage of concentration of valuable products in the matte, and the suggestion points significantly to pyritic smelting.

To the application of hot blast is due the great economy and efficiency realized in modern iron smelting practice, for it is the application of heated blast that has made the great iron furnaces of today possible. Blown with cold blast not one of them could run a week. Heated blast, making uniform conditions of combustion and of consequent reactions, possible in each individual cross section of the furnace, has made high blast pressure possible, without which furnaces of large cross section area could not be blown and this in turn makes deeper ore columns necessary and hence higher stacks. There is no condition of blast temperature applying in iron smelting that does not apply with equal force and effect in lead smelting for gold and silver, in copper matting and in pyritic smelting. Localization or distribution of heat, according to conditions demanded by the reactions sought to be realized, are accomplished by formulating suitable relative proportions of air temperature, pressure and volume, cross section of the furnace at the tuyeres and general dimensions, with a certainty and regularity not possible in cold blast smelting.

Electrical Progress.

In a paper read before the Pennsylvania Street Railway Association, F. W. Darlington, speaking of electric railway motors, said: "So far as the motor alone is concerned, there is no longer a possibility of doubting its ability to do the work of a steam locomotive. It can make a car move as fast and faster. It can pull heavier loads, by reason of its power being supplied from some exterior source, and, hence, having practically an unlimited supply, it can climb steeper grades, and it can reduce expenses. Can more than this be asked of it? I think not. There remains, however, the question of how to transmit the electricity from the stationary engine and boiler plant to the motor on the car. It has been proven beyond doubt that power can be developed in a stationary powerhouse at a large saving of coal and other expenses. Of this fact, and that of the ability of the motor to do all the work demanded of it, there is no difficulty in convincing the steam railroad man. But the inability to prove beyond a doubt that the power can be transmitted satisfactorily for long distances is where the failure lies. This is the one point to be worked out and demonstrated before there will be any general adoption of electricity for long distance roads."

At the Liverpool meeting of the British Association for the Advancement of Science, the president, Sir John Lister, Bart., D.C.L., in his address, speaking of the Roentgen rays, said: "Mysterious as they still are, there is one of their properties which we can all appreciate—their power of passing through substances opaque to ordinary light. There seems to be no relation whatever between transparency in the common sense of the term and penetrability to these emanations. The Roentgen rays cause certain chemical compounds to fluoresce and emit a faint

light plainly visible in the dark, and if they are made to fall upon a translucent screen impregnated with such a salt it becomes beautifully illuminated. There is no reason to suppose that the limits of the capabilities of the rays in this way have yet been reached. By virtue of the greater density of the heart than the adjacent lungs with their contained air, the form and dimensions of that organ in the living body may be displayed on the fluorescent screen, and even its movements have lately been seen by several different observers. * * * The important applications of the new rays to medical practice have strongly attracted the interest of the public to them, and I venture to think that they have even served to stimulate the investigations of physicists. * * * There is another way in which the Roentgen rays connect themselves with physiology, and may possibly influence medicine. It is found that if the skin is long exposed to their action it becomes very much irritated, affected with a sort of aggravated sunburning. This suggests the idea that the transmission of the rays through the human body may be not altogether a matter of indifference to internal organs, but may, by long continued action, produce, according to the condition of the part concerned, injurious irritation or salutary stimulation."

AT a meeting of the American Institute of Electrical Engineers, President Louis Duncan of Baltimore read a paper on "The Present Status of Power Transmission," in which a number of the longest transmission schemes now in operation were reviewed. All of these, except the transmission at Geneva of 20 miles, were by the polyphase system. The longest was 35 miles. The highest voltage used, alternating current, was given as 13,000 volts, but M. Thury's direct-current transmission at Geneva employed a voltage of 15,000. As to the distance to which current could be sent commercially, the author believed that fifty miles at 30,000 volts would be practicable, provided the power could be sold at a profit. In long distance transmission for railroads he was very dubious of the outcome. If attempted, it would have to be by means of high potential alternating currents feeding rotary transformers located at frequent intervals along the line. The demand on any given section of a road of this kind varied between such very wide limits that the economic problem involved became quite a serious one, and he did not believe the storage battery had yet been made that, with reasonable outlay, could meet this demand.

UNDER the agreement made between the American Bell Telephone Company and the Western Union Telegraph Company, payments have been made as follows during the years named:

1881	$ 94,000	1889	$ 511,000
1882	100,000	1890	575,000
1883	246,000	1891	614,000
1884	354,000	1892	648,000
1885	396,000	1893	690,000
1886	404,000	1894	460 000
1887	433,000	1895	296,284
1888	467,000		
Total			$6,368,284

This agreement was brought about by the Western Union retiring from the telephone field and turning over to the American Bell Company its patents, chief of which were those of Thos. A. Edison.

IT is reported that Warden Coffin, of the Ohio State prison, is having difficulty in buying an electric plant to carry out the electrocution law. None of the manufacturers will take an order for such a purpose.

IT is announced that Herr Dorman, of Bremen, has succeeded in photographing objects by Roentgen's method through iron plates twenty-two centimeters thick.

IN 1865 the eleven street-car lines in New York carried 80,000,000 passengers in a twelve-month. In 1875, 13 lines carried 140,582,793; in 1878, 15 lines carried 169,105,739; in 1883, 15 lines carried 266,164,236; in 1893, 16 lines carried 453,652,064. It is estimated that the traffic for 1896 will not be far from 1,000,000,000 passengers.

Practical Information.

The Future of the Sahara.

M. Bonnel de Mezieres, member of the Maistre and Attanoux Missions, has, says the London *Daily News*, expressed his opinion on the future of the Sahara, to the effect that there is no doubt that immense sand ocean will be in time changed into a fruitful territory. He says:

"The Sahara rivers which I have crossed all hide a rich subterranean stratum of water, and form the natural passages to the Soudan, on which, with very little trouble, vegetation can be largely developed. In the south of Temassinin and in the Igharghars there are groves of tamarind, gum trees, etc., of two miles long, scarcely separated by grassy and clover-covered plains. The rivers, which in spring are full of water, are from three to ten miles wide. When the water retreats, the beds of the rivers are changed into rich meadows. The date seeds planted by Flatters at El-Biod have grown without the least care into fine trees, and the same is the fact also of the seeds planted near the cisterns of Tebalbalet, in spite of the inconsiderate manner in which the Tuaregs get in the harvest. Trees are not so rare in the Sahara as is supposed. The Tuaregs often assured our expedition that we should have to march for two or three days without finding water, but very soon we found a little out of the path some filled up or otherwise purposely hidden wells. For the Tuaregs, who serve as guides to caravans, always choose the most difficult and desolate routes, in order to keep the caravans in a state of dependency. Caravans will become more frequent; travelers will succeed each other, but the secret of the Sahara is well kept, and its reputation of barrenness is still preserved. When Lieut. Hourst and Lieut. Bluyet explored the region and an arm of the Niger they found a lake nearly 100 miles long. And when the officers of the Timbuctoo extended their excursions, they found that not only one, but more than twenty, lakes existed—all very large, and stretching far to the north into the very heart of the supposed arid Sahara. If there be no water, and therefore no vegetation, where does the charcoal come from which is sold by the Tuaregs? Where do they find nourishment for the numerous camels, horses, sheep, asses and goats they possess?"

THE large number of torpedo boats now being built for the U. S. Navy brings forth some features in machinery exceptionallv interesting and novel. On some boats of this kind recently launched the equipment of steam pumps, as well as the main engines, are run without the use of oil in the steam cylinders. While this is not a new idea, so far as vertical steam engines are concerned, it has never been the practice to run steam pumps without oil. The pumps are arranged without any oil holes whatever, so that it is impossible to get oil into the steam cylinders. These pumps were given an exhaustive test for several days by the manufacturers and they operated with entire satisfaction, and without using a drop of oil. The doing away with the use of oil in the steam cylinders of a vessel is a matter of considerable importance, as there is no necessity of carrying feed-water filters and no anxiety about oil injuring the boilers.—Scientific Machinist.

IN 1895 there were 251 life-saving stations on the Atlantic, Gulf and Pacific coasts and on the Great Lakes, by far the greater number, 184, being located along the Atlantic coast line. There is but one station on a river, at the Falls of the Ohio, Louisville, Kentucky. The number of disasters happening to vessels on these coasts during the year was 675. The property involved was of the value of $10,725,175, of which nine-tenths was saved by the life-saving service, salvage companies and wrecking tugs, working in conjunction. The lives which were threatened by these disasters numbered 5823. Of these only 26 were lost. Of the saved, 800 were succored at the stations. The number of vessels totally lost was 73 of the 675 that were in jeopardy. On the New Jersey coast, which was guarded by 49 stations, nearly 1000 persons were on board vessels which were in danger and only one person was lost, and of more than $2,000,000 worth of property in peril only $83,535 was lost.

Canals a Success.

The Suez canal, which has now been in operation for more than twenty-five years, was during the first year patronized by only 486 vessels, with a total net tonnage of 436,609. In 1880 the net tonnage was 3,057,421 and in 1890, 6,890,094. It is estimated that the tonnage for 1896 will be above 9,000,000. The total cost of the canal was about $100,000,000, or $1,000,000 a mile, and since then expenditures have been incurred for improvements amounting to some $40,000,000 more. But the enterprise is so profitable that it pays not only the fixed interest of 5 per cent on all its bonds, but from $4,000,000 to $5,000,000 a year in addition, as dividends to shareholders and bonuses to employes.

The Manchester ship canal has been in operation less than three years, during which trade conditions were none of the best, but it has nevertheless been a success. In its fifth half year the sea-going traffic amounted to 668,000 tons—an increase of more than 154 per cent compared with the figures for the first six months. There is every indication that the increase will continue, as the canal has saved Manchester merchants a great deal of money each year by reduced railway rates and lower charges of shipping firms at Liverpool. Thus we have two instances in which internal waterways became a decided success in spite of the predictions of failure that were so freely made.—American Manufacturer.

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We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colo.

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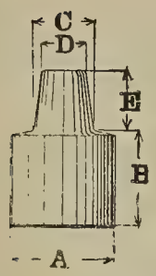

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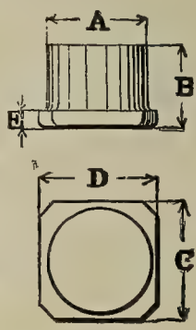

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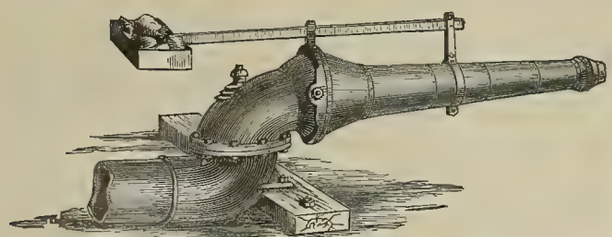

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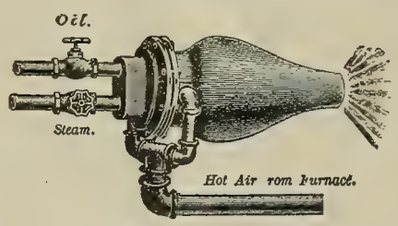

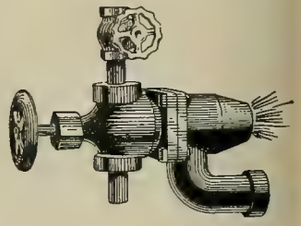

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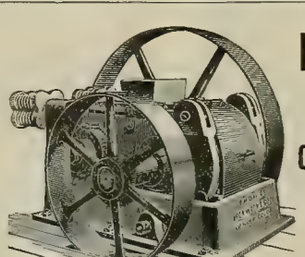

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING OCTOBER 6, 1896.

569,000.—CARD CASE—C. L. Adams, Orange, Cal.
569,078.—HEAD REST—J. A. Barker, Pasadena, Cal.
569,146.—WINDOW SASH—E. S. Barney, S. F.
568,880.—COLLAR PAD—C. Bartlett, Pomona, Cal.
568,892.—SHOE SOLE GROOVING MACHINE—G. Bryant, S. F.
568,942.—PLOW—J. Fouche, Visalia, Cal.
568,754.—SAW—J. E. Fox, Seattle, Wash.
568,902.—POWDER—F. A. Halsey, San Rafael, Cal.
568,852.—HEATER—Z. D. Johns, Visalia, Cal.
569,017.—PUMP—Lefebvre & Upton, Eureka Junction, Wash.
568,781.—CAN TILTER—H. C. Mahon, Junction City, Or.
568,954.—HEATING APPARATUS—G. L. Marble, Seattle, Wash.
568,913.—GOLD SEPARATOR—J. Marshall, Fairfield, Cal.
569,110.—STEP LADDER—T. J. McCormick, Pomona, Cal.
568,921.—FAUCET—Pokrantz & St. Hubert, S. F.
569,031.—TIGHTENER—T. Pusey, Stockton, Cal.
569,069.—QUARTZ MILL—F. P. Snow, Baker City, Or.
568,998.—KNIFE OPENER—A. C. Weeks, Alhambra, Cal.
568,934.—CRUDE OIL BURNER—D. C. Wilgus, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FAUCET AND AIR INLET ATTACHMENT.—Charles L. J. Pokrantz and Jules Ch. de St. Hubert, San Francisco, Cal. No. 568,921. Dated October 6, 1896. This invention relates to a faucet and air inlet attachment for demijohns, casks and other vessels containing wines, and a means for preparing the air which is admitted into the vessel so that it will not affect the wine and cause it to deteriorate. It consists essentially of a tube or passage leading from the interior of the vessel to the outside substantially parallel with the faucet shank, having an air inlet at the outer end to admit the air to the vessel, a readily removable casing to be seated upon the shank and fitted over the outer end, and means for supporting a body of pulverized material within the casing and over the air inlet of the tube so that the air is filtered before being admitted into the vessel.

ADJUSTABLE SLIDING AND SWINGING WINDOW SASH.—E. S. Barney, San Francisco, assignor of one-third to A. T. Dewey, same place. No. 569,146. Dated October 6, 1896. This invention relates to that class of sashes which are adapted to ordinarily slide in vertical guides in the casing, and which are also adapted to be hinged so as to be temporarily opened inwardly from the casing so as to obtain access to both sides of the window. It consists essentially of the combination with a window sash of a cord retainer vertically slidable between the edge of the sash and the casing, having its upper end adapted to contact with a stop on the casing when the sash is at the top, whereby the sash is relieved of the pull of the weights, a transversely sliding bolt movable on the sash with its point adapted to automatically engage a slot in the cord retainer when in line therewith and a notch in the bolt which locks it in engagement with the retainer and prevents its withdrawal until the retainer contacts with the stop and allows the sash to move upward enough to disengage the lock. A removable stop is also employed which may be secured at various points on the casing where it may be desirable to stop the cord retainer.

MACHINE FOR GROOVING BOOT OR SHOE SOLES.—George Bryant, San Francisco, Cal., assignor to Alice Elizabeth Bryant, same place. No. 568,892. Dated October 6, 1896. This invention is designed to form transverse grooves in the leather of which boot and shoe soles are formed so as to render the soles pliable, while retaining a sufficient thickness of leather to render them moisture resistant and to give good wearing qualities. It consists of a gang of saws adjustably fixed upon a saw arbor, mechanism by which the saws and arbor are rotated, a corrugated roller, the shaft of which is journaled in vertically adjustable boxes above the cutters so that the material to be grooved is passed between the roller and the cutters, and in conjunction with this tension screws which press against the rollers so as to retard the rotation and cause the material to move at a rate of speed less rapid than that of the cutters.

Obituary.

MONROE GREENWOOD died at his home in San Mateo last Sunday of heart failure, at the age of 68. Mr. Greenwood came to California in 1851 and has long been prominently identified with important interests. At the time of his death he was president of the California Electrical Works and vice-president of the Sunset Telephone and Telegraph Company.

Coast Industrial Notes.

—The members of the State Bureau of Highways have in contemplation a bill to be presented to the next Legislature creating a State highway from the northern to the southern boundary of the State.

—The Ventura oil refinery has fired up for the first time in four months, and the manufacture of petroleum products been begun along enlarged lines. The differences which resulted in the closing down of the plant have been adjusted, and all claims against the original company have been satisfied in full.

—It is understood that the Federal Government has decided in favor of the Smith's Cove route for the canal connecting Lake Washington and Puget Sound. It has been generally understood that the Sound outlet would be by way of Salmon bay, but the chief of the Bureau of Engineers states that the Secretary o the Interior has definitely decided in favor of Smith's Cove. By this decision the canal is brought within the city limits of Seattle.

—All the real and personal property of the Redwood City Electric Company has been transferred to the Peninsula Lighting Company at Redwood, San Mateo county. The new company is a San Francisco corporation. This plant is at present furnishing incandescent lights to the residents of San Carlos from Redwood City, and poles are erected to Menlo Park. The new company has the material on hand for extending the system to Woodside and to Mayfield and Palo Alto in Santa Clara county.

Recently Declared Mining Dividends.

Utah, Utah, $2000, payable October 20th.

Galena, $5000, payable October 15th.

War Eagle Gold Mining Co., British Columbia, $30,000, a total of $197,000.

Bullion-Beck, Utah, $30,000, payable October 15th; total since January 1st, 1896, $215,000; total since organization, $2,165,000.

Swansea, Utah, $5000, payable October 20th.

Mercur, Utah, $25,000, payable October 20th. This gives a total of $525,000.

Portland Mining Co., Colorado, $30,000, payable October 15th.

Mount Rosa Co., Colorado, $5000, payable October 15th.

Anchoria-Leland, Colorado, $6000, payable October 15th.

Personal.

T. C. SCHRADER, J. E. Spurr and H. B. Goodrich of the United States Geological Survey, who have been in Alaska making an examination of the gold fields of the Yukon, have returned to this city.

J. H. TIBBITS, who recently returned from South Africa, and has been staying at the Palace Hotel for some weeks, has left for Arizona to inspect some mining properties and will return in about two weeks.

Recent California Mining Incorporations.

Cascajo Gold Mining Company, San Francisco. Rudolph Jordan Jr., Hugh Craig, San Francisco; John Somerville, Philip C. Musgrove, West Point, Calaveras county; John F. Smith, Alameda. Capital stock, $1,000,000; all subscribed.

Daphne Gold Mining and Development Company, San Francisco. Richard E. Kelly, Herman Zadig, Alameda; James K. Cosgrave, Adolph Greenfield, San Francisco; Frank H. Waddell, Trinity county. Capital stock, $500,000; subscribed, $1,100.

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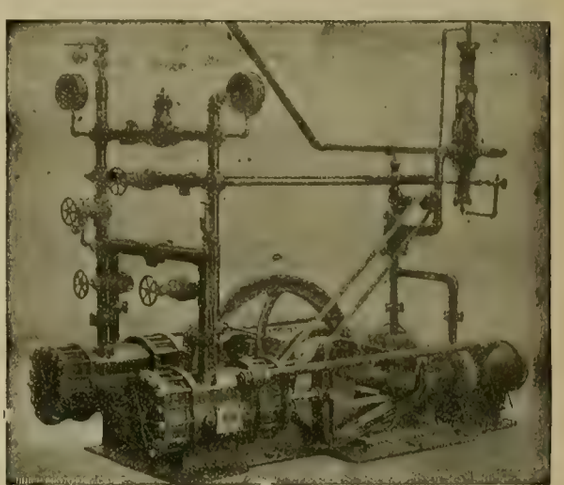

This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to PNEUMATIC POWER CO., at 306 Pine St., San Francisco, Cal. We could save you money, though, in cost of foundations, as our Compressors are half the size of other makes.

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Mining Summary.

CALIFORNIA.

Amador.

Ledger: The purchasers of the Lighthouse mine have extended the tunnel and crosscut the ledge. They have cut a 22-inch ledge of good gold-bearing quartz which shows free gold. The owners of the property intend to erect a 5 or 10-stamp mill immediately.

Robert Reed is prospecting on the Rocky Ford, where he is crosscutting a ledge and is in 50 feet without finding the walls.

C. C. Clark and John L. Madden have made a deal with Bailey, Porter, Bailey & Co. of San Francisco by which the latter have, for about $200,000, secured the Maximilian, Hayden Marre and Allen properties, above Sutter Creek, consisting of about 230 acres. They are going to work immediately, having already contracted and arranged for about $50,000 worth of machinery.

Amador *Record*: The Potayuba Mining Company has let a contract for a hoisting plant.

Dispatch: I. N. DeWitt has commenced a tunnel across the gulch from the mill of the Amador gold mine to run 1000 feet into the hill to strike a ledge which crops out at the top of the ridge.

Republican: The Union Consolidated Mining Company are running 10 stamps of their mill, and the mill will be running to its full capacity in the near future. The men are sinking and preparing to work the mine to its full capacity.

Butte.

At the Golden Feather, under the management of George H. Evans, a new elevator patented by him is now being used on the ground, and the work it is doing is phenomenal in stripping the reaches in the upper section of the claim to bedrock. The ground in this portion of the Feather is very difficult to handle, owing to boulders of enormous size, and the worst of it is that so far the territory covered has all been worked before in early days. Mr. Evans thinks, however, that he is now nearing the head dam of the last pioneer venture of the kind, and from that on it is expected that the returns will be high enough to remunerate the company for its large outlay of money in the works.

Development work in the Banner mine is being pushed forward as rapidly as possible in order to reach the pay chutes on the 800-foot level, 900-foot level, 1000-foot level, including winze, and therefore low-grade ore only is being milled, the cleanup from which will be small.

Oroville *Mercury*: It is reported that the Princess mine has changed hands, and a new company organized.

At the Diamond mine, at Mountain Cottage, $10,000 worth of new machinery has been received, and they are working twelve men on good ore.

Henry Turner, of the Big Bend mine, has 100 Chinese miners under his charge at river mining.

The Clarke mine, near Big Bend, which has been running by arrastras, has shut down on account of lack of water.

Many prospectors are at work in Hubbard's flat, near Big Bend, and good wages are made by many.

At the William Pinkstoun quartz mine five stamps are running night and day.

Calaveras.

Angels *Voice*: A new hoist is being built at the Thorp mine. Two hundred feet will be sunk at once.

Colonel Woodrow has purchased a new engine, boiler and other machinery for the Santa Anna mine on Albany Flat.

Chronicle: A company of San Francisco capitalists are operating the Sand Hill gravel mine near Camanche. A greater depth than ever has been reached on the channel, and the pay gravel is said to be 35 feet in width. Extensive machinery is soon to be put on the mine.

Sinking at the South Paloma mine is going steadily ahead. The shaft is now down over 200 feet. Steam power is used.

Prospect: The 10-stamp mill at the Fellowcraft mine at San Andreas has been started up. This property was sold last May by Col. E. C. Culp to A. J. Weatherhead, W. P. Sargeant, S. Prentice Baldwin and Prof. P. L. Hobbs. The main shaft is down over 230 feet, with a ledge varying in width from 5 to 10 feet, while the ore throughout prospects well. There is a 40-foot hoist, capable of sinking the shaft to a depth of 1200 feet. There is also a complete electric light plant for lighting the mine and buildings as soon as required. The hoist is run by water power, while steam is the motive power for the mill.

The tunnel of the Hexter Mining Company, near Mokelumne Hill, has reached a depth of 700 feet. It is estimated that 3000 feet will have to be driven before the channel is reached. This channel is probably the largest in that part of the county and the gravel was always found to be very rich wherever it was tapped, but on account of the great depth to the bottom of the channel, and the perfect river of watar encountered, the channel could never be worked advantageously. Although the work undertaken by the Hexter Company is something enormous, still it is the only feasible plan of working that channel.

El Dorado.

(Special Correspondence).—A trip was recently made by the writer to a gravel property, near Grizzly Flats, that will rival the greatest gold producers. Forty years ago a large area was hydraulicked until the cement made further work under this method unprofitable. In the face of the bank two layers of paying gravel are well defined, each about 3¼ to 4½ feet deep, one immediately on the bedrock and another above, with a streak of lava probably 3 feet intervening. One year ago last month a tunnel was started from the hydraulicked face of the bank in a northeasterly direction, which has reached 750 feet and is double-tracked with steel T rails. The tunnel runs 560 feet up stream, from which there are two crosscuts of 85 and 105 feet respectively. The channel is cut one mile north by a deep canyon. There are 320 acres of land in this property, all on the channel. The gravel that I prospected, taken promiscuously, will average $5.00 per car. The black sand assays $306.00 per ton. In the spring a 20-stamp mill will be erected about 600 feet from the mouth of the tunnel, which will be operated under 260 feet pressure by water brought through a ditch seven miles in length, which is already constructed. There is now enough gravel in sight to operate a 20-stamp mill for three years. This proposition is owned by an English stock company of which Livingstone Gibson is president. Col. W. J. Sutherland is also interested. A. A. McDonald is superintending the work and keeps three shifts steadily employed. This will be known as Grizzly Flat Gravel Gold Mining Company.

On the Big Four, near Garden Valley, a whim has superceded the windlass, and the shaft is now 70 feet deep. The ore body continues at 2½ feet.

Since my last notes were forwarded, there were twenty-seven names of mine seekers registered at two of our hotels. Among these were six representatives of foreign capitalists. El Dorado county will gradually regain her prestige as a good county for investments in mining. Her former placer diggings, which produced millions of gold, were but a forerunner of greater wealth contained in her great quartz ledges which are now being unearthed deep down on the mother lode.

The tunnel on the Eagle mine, near Grizzly Flats, has reached 750 feet on a 3-foot ledge. There will be 250 feet backs when the tunnel is completed. This is the property of Mrs. Hoskins.

At Russian Diggings, near Grizzly Flats, Budworth & McLeod with four others, all from Livermore, are running a tunnel which has attained a length of 200 feet in a gravel property which they will operate as a drift and hydraulic proposition.

On the old Bullard mine, now owned by Joseph Lyons, the old tunnel has been cleaned out, track laid and a new tunnel extended to length of 250 feet, with 20 feet of stope added. The ledge is from 1 to 3 feet. A crushing of twenty tons of rock will be made next week.

Boiler, engine and hoist are being placed on the Amazon, beyond Kelsey. The shaft is down 125 feet, three skips pushing the work. The property is about eight miles north of Placerville.

On the Extra, near Grizzly Flats, twenty-five miles east of here, Claibourne & Pincini are stoping from a 400-foot tunnel. The ore body measures from 2 to 3 feet and is free milling, with small percentage of rich sulphurets.

Placerville, Oct. 13, '96.

F. B. Lloyd of Oakland has purchased from Bosquit, Noyes & French the Rodger & Crawford mining claims, near Placerville. These claims adjoin the group of fourteen properties recently bonded from Melton & Parlow by T. T. Lane.

C. H. King of Oakland has purchased from the Collins estate 170 acres of mineral land and ditch properties and will begin development work. This property is situated twenty-five miles north of Placerville.

Kern.

Californian: At Red Rock on Friday a miner named Nelson found two big gold nuggets—one 4½ ounces and the other 3½ ounces in weight. In the Red Rock district everybody seems to be taking out pay dirt.

Another rich strike is reported to have been found along the Randsburg road in the foothills adjacent to Randsburg canyon.

Mariposa.

(Special Correspondence).—The report that a sale of the Mariposa grant is on the tapis, mentioned by the MINING AND SCIENTIFIC PRESS last week, has been fully confirmed. As representing the owners of the grant Senator John P. Jones will reach San Francisco in a few days. There he will be joined by Hamilton Smith, the well-known mining expert who will act on behalf of the Exploration Company, Limited, of London. It is a significant fact that this influential corporation has just established offices in San Francisco to control what operations they may undertake on this coast. The general management will be in charge of Captain Mein, who recently returned to this State after taking a prominent part in the late South African troubles. As regards an inspection of the very extensive old workings on the Mariposa grant, Mr. Hamilton Smith will find it impossible to make a systematic investigation, as the ground has caved in nearly every direction. John D. Ludwig has about completed retimbering the Josephine mine and getting it ready for inspection. The depth there is only about 300 feet. The Princeton was the deepest mine, being down over 600 feet, but it is caved from top to bottom. Mr. Hamilton Smith's report will necessarily be of a general nature on the character and formation of the 44,000 acres comprised in the grant, and as such will be looked for with great interest as it will in its main features be equivalent almost to a report on the mother lode from Pinon Blanco to Mormon Bar. Of course there are the past records to go upon and these have already been carefully compiled and scrutinized. As was mentioned some months ago in the MINING AND SCIENTIFIC PRESS, Edward Bates Dorsey, accompanied by a shorthand reporter, spent considerable time in interviewing and taking statements on the ground from old residents who were familiar with the mines when they were in operation. Up to the present time it has been impossible to ascertain the price or terms upon which the grant has been offered, but the past record of the Exploration Company, Limited, makes it reasonably certain to predict that should it take over the property its operations will be prompt and on a large scale.

W. E. Selleck has returned to Chicago. Before leaving he let an extensive contract for tunneling to the westward in the mine at Haywards.

J. B. Irving of Carlisle, England, has bonded the Stud Horse Flat mines from Thorne, Waters and Jenkins. These mines are about 1½ miles below Benton mills on the south side of the Merced river, and immediately opposite the Red Banks. There are three full claims and beyond two years' assessment, but little work has been done.

The Hite's Cove and other mines in that section of the county have recently been coming in for some share of attention and parties are now on the ground inspecting. No details are yet available.

Capt. A. H. Ward has been on a visit of inspection to Pinon Blanco. He has returned to San Francisco entirely satisfied with prospects.

The Tyro mine is working on quartz from the 700-foot level. Joseph Buttgenbach, the president, is visiting the property. The mill is running night and day on rock reported richer than anything in the past history of the mine.

Coulterville, Oct. 13, '96.

Miner: Fred Whitman has put a force of men to work running a tunnel to cut the main ledge on the Bondurant. The tunnel will have to be run about 500 feet before the ledge is encountered.

The Laura La Grande mill at Hazel Green is running steadily on ore from the mine with good results. The company will add five stamps to their mill in the spring.

The Melvina three-compartment shaft is now down 700 feet. It is the intention of the company to sink to a depth of 1000 feet.

The Louisiana shaft is now down 175 feet, and the company intend to build a 10-stamp mill this fall.

Nevada.

Union: At the Cadmus mine during the past week specimens to the value of about $7000 have extracted. There are three parallel ledges, between which there are several stringers and the rock taken from these stringers is exceedingly rich. The company is putting up a new mill.

Transcript: The Forest mine, near the Mount George, is showing very encouraging results for the amount of labor and money expended. The ore is very rich, but the vein, which is one of three that form the main lode, is quite small, being from 3 to 6 inches wide. From all indications when these veins come together they will form an ore shoot 3 or 4 feet wide.

Union: At the Metropolitan mine at Moore's Flat the new mill has been started up. About sixteen men are employed and the prospects are encouraging. The ledge is a large one and the pay shoot is said to be an extensive one.

Transcript: The Montana mine, in Willow Valley district, has been bonded for two years to Francis N. Burns and C. H. Tubbs. They expect to commence work soon and reopen it. The ledge has paid from the grass roots and in times past was quite rich.

Placer.

Colfax *Sentinel*: The average yield per running foot of all channels on the Forest Hill divide is $150. This estimate is made by Ross E. Browne and Chas. F. Hoffman, superintendent of the Red Point mine.

The Hidden Treasure Company of Sunny South are making extensive improvements in the Dam claim at Centerville. Near $90,000 has been expended in development work during the past two years, and this without levying a single assessment. The main tunnel is in over 6000 feet. The numerous drifts and crosscuts leave the gravel in blocks 200x260 feet, ready for breasting.

Much development work is being done at the Glenn and Gray Eagle Consolidated drift mine on Bald mountain, above Secret House. This claim comprises about 400 acres of land.

The Big Channel claim, formerly owned by J. S. Ferrier of Todd's valley, has been sold to Eastern capitalists.

Plumas.

Independent: Horace Reynolds and others have purchased the Moore property on Rich bar and will work out the old town site, which, from its surroundings, is supposed to be rich.

Plumas *National-Bulletin*: The owners of the Frazier mining property at Granite Basin propose to remove the old Huntington mill and put in a 5 or 10-stamp mill.

San Diego.

Ramona *Sentinel*: The Owens mill is running day and night. On the 300-foot level they have run 250 feet on a ledge of good pay rock, which is 4 feet in width.

The machinery for the Ranchita mill has arrived.

The Cincinnati Belle mine is having a crushing of sixteen tons of rock at the Gold Fling mill.

The Chaparral mine is having its rock—about fifty tons—hauled to the Ready Relief mill.

Shasta.

Searchlight: It is reported that a large force will soon be put on at the Mammoth mine in Old Diggings district. The smelter at Keswick will help this camp, for the ore in the district contains a larger percentage of silicate than any other in the county, and this is what the smelter needs for flux. A tramway has been put in at Spring Creek to encourage shipping from that side of the river, and ore will be transported to the smelter in narrow gauge cars free of charge. Mines that could not be worked successfully before can now be worked profitably.

Much interest is being manifested as to the success of the new smelter at Keswick. The company has entered into a contract with R. G. Hart for twenty-five tons of ore daily from the Texas mine to be used as a flux at the smelter. Ore for the same purpose will be used from the Mammoth and Central mines. On the success of this enterprise much of Shasta county's future development depends.

Sierra.

Grass Valley *Union*: At Forest City, on the North Fork and Lucky Dog mines, twenty-two men are employed. In the former the prospects are encouraging, and it is expected that the deep channel will soon be tapped. The tunnel is now in 2600 feet.

Active work is going on at the Bald Mountain Consolidated, and the tunnel is now within 50 feet of the channel. Work has been prosecuted at this mine for over two years, and the tunnel is in 2350 feet. The channel is known to be rich, and the owners expect big results for their perseverance.

One of the paying gravel mines is the Mott, at the head of Slug canyon. Although not many men are employed, the property is on a paying basis. At this mine the tunnel is in over 1600 feet.

At the old Bald Mountain Extension mine considerable pay gravel is being taken out. For several years the mine paid dividends to its owners. Twenty-five men are employed.

The W. S. Hanley mine employs from fifteen to twenty men, and the work of prospecting the channel is going on.

There are several other mines of less importance in and around Forest City, all of which are being prospected.

Enterprise: Word comes from the Gold Bar mine at Cleghorn that some fine gravel is being encountred.

Work has been resumed on the prospect shaft of the Verdi placer claim on Mill creek.

Mountain Messenger: The Columbia Channel Mining Company has commenced a tunnel at the head of Wolf creek, near American hill, to develop the Henness Pass Ridge channel.

Siskiyou.

Yreka *Journal*: Bailey & Carrick are still taking out some rich ore at the Katie May mine, on Greenhorn. The rock will go about $100 a ton, which is the richest quartz in this district.

The Chinese company who are working the McConnell & Quinne claim, at the mouth of Humbug creek, are accomplishing some excellent work this season.

The Gold Ball mine on Salmon river is still closed and it is not known how soon it will again start up. The 20-stamp mill on this property, with the other modern methods of mining, is the largest plant in Siskiyou county.

Tuolumne.

Independent: At the Black Oak mine the cyanide plant is doing good work. The reduction of the ores by this process shows its value to recover fine gold at a profit, superior to any other treatment of these particular sulphurets.

Everything is being pushed rapidly at the Soulsby mine towards the completion of the new hoisting works, which consist of both water and steam auxiliary power machinery. There are forty men employed.

The Keltz mine has cleaned up with better results than expected. A new and rich chute had lately been struck. Instead of reducing the hands, as had been contemplated, additional men will be sent in.

The Rappahannock is crosscutting east and west, and sinking a shaft south of the main shaft, where they have exposed a good body of ore.

The Jumper mine is credited with having cleaned up during the past month nearly $160,000.

Union-Democrat: A contract for a 30-stamp mill at the Confidence has been let. The drift on the 800-foot level that runs north a distance of 1200 feet has been cleaned out and large bodies of good ore were found. In a short while over one hundred men will be on the pay roll. At present twenty-five are employed.

At the Santa Ysabel work has been started on the No. 3 shaft. Since the power plant was completed more men are being added to the working force, and plans have been outlined for a busy winter's development.

The Belleview is crushing about thirty tons a day. Improvements in the mill will be made this fall. A new source of power will be secured, as steam power is too expensive.

NEVADA.

It is reported that Captain De Lamar, the mining capitalist, has taken an option on the Rose group of mines at Tuscarora, Nev.

Territorial Enterprise: The Jumbo mining district, on the western slope of Mount Davidson, offers an unusual inducement for capital. Although every man working a claim in Jumbo mining district has unlimited confidence in the downward continuation of the rich deposits, they are all men without capital, and as outside districts in Nevada have always been neglected by moneyed men nothing which may be said to be in the way of genuine development has ever been done in this district.

White Pine *News*: The mill of the North American Mining Company at Egan canyon began crushing ore October 1st, and the company will make regular shipments to the head office at Salt Lake City. There are now at the mill and dumps of the mine some 3000 tons of high-grade gold ore, which will be treated by the cyanide process.

Manager C. H. Wilbur of the Golden Eagle and Ophir Consolidated Mining Companies promises in a few days to place upon this market a carload of ore exceeding in its auriferous values any that has ever been shipped from Central mining district. At the Golden Eagle the connection between the shaft and tunnel has been accomplished through an upraise, at which point there is reported 3¼ feet of ore, the vein having been followed in the tunnel for a distance of 300 feet. Upon the same property another tunnel has been driven upon

a parallel vein in which ore has been encountered that yields $35 in gold, and that, with the other metals, brings it up to that which prevails in the discovery ledge.

State Journal: One of the greatest achievements in mining accomplished in Nevada since Sutro designed and saw put into practical operation the tunnel which bears his name, has just been effected at Austin. The largest bodies of ore that have been discovered in this camp lie on Lander hill. Here were early operated the large South America, Frost, Lander and other works. Although these mines were all located high upon the hill, yet on getting down a few hundred feet, so great a flow of water was encountered as to make further progress downward on the ledge impracticable. In early days a tunnel had been started with a view of cutting the ledges. This tunnel was worked upon from time to time, but it remained for the present company to tap the network of mines.

Several men were put to work on the Phoenix mine this week and reports indicate that it is a regular bonanza. At the bottom of the shaft, which is 70 feet deep, the ledge has been crosscut for over 14 feet without having reached the wall. The ore is a gold-bearing quartz of a high grade.

OREGON.

Ashland *Tidings*: The Homestake mine at Woodville has been started again. The first grade ore will be shipped to Selby & Co.'s smelting works and the second grade ore will be milled at the Ashland mill.

A correspondent at Wimer says that numerous reports are coming to that place of a big strike on the headwaters of Pleasant creek, and causing much excitement. The reports are that a large semi-porphyry dike has been discovered by a party of prospectors. It is said to contain large quantities of free-milling ore, running from $100 to $200 a ton. About 100 men are at the scene of discovery.

Crow & Co. will ship a carload of ore from their Lost Flat ledge to the Ashland mill. The ore now being taken out is much richer than that sent to the mills several weeks ago. The quartz is packed on mules from the mine a distance of about fourteen miles, then hauled in wagons to Merlin, about six miles, then by rail to Ashland.

Grants Pass *Observer*: The Picket Creek Mining Company, with John Aiton as superintendent, are progressing rapidly in the construction of their ditch. They are working eight men and have completed two miles of ditch. Its full length will be 7½ miles.

Baker City *Bedrock Democrat*: Orders have been received to arrange for building a 10-stamp mill at the Columbia Mining Company's property in the Cable Cove district. In the spring it is the intention of the company to add thirty stamps, making forty in all. The Columbia is the property recently purchased by Eastern capitalists from the Cable Bros.

The Union-Companion Mining Company are preparing to run a tunnel on the Bradley mine, above the Union-Campanion.

BRITISH COLUMBIA.

Ashcroft *Mining Journal*: The Cariboo Gold Fields Company are preparing to drift their gravel that is too low to be hydraulicked.

Mining Review: On the first of October the second payment was made on the bond on the Iron Horse fraction, which is now controlled by J. W. Turner and partners, of Seattle. The claim is looking well. There are 2 feet of ore in the bottom of the shaft.

The C. & C. has been sold through Messrs. Evans, Coleman & Evans, of Vancouver, to an English syndicate; consideration, $25,000 in cash and £30,000 in paid up stock of a company with £100,000 capital.

The Colonna Gold Mining Company has been incorporated for $1,000,000. The property of the company is between the Monte Cristo, Evening Star, Silverine and Eddie J. There are three distinct veins running through the property, each one characterized by strong and wide iron cappings.

The War Eagle and Iron Mask have been sold to English capitalists.

Paul Gaston has sold the Gopher to an eastern Canadian syndicate, represented by John McMartin. The price of the property is reported to be $50,000 on a short bond. The Gopher adjoins the Homestake.

The Le Roi mine is now shipping about 150 tons of ore per day, 50 tons of which is taken from the big dump at the mine.

UTAH.

Salt Lake *Tribune*: Investigations have convinced M. M. Riley that ores recently uncovered by him and his associates in the La Sal mountains may be profitably handled in the form of a matte, and, to reduce it to that form, work upon a small roasting plant will commence in a very short time.

The new streak of high-grade ore encountered in the Creole consists of 18 inches overlying the manganese.

On the Wonder, at Mercur, the shaft has now attained a depth of 450 feet, at which level a streak of porphyry has appeared. The management is looking for a favorable change at any time.

The Bullion-Beck Company has paid in dividends $2,165,000. For nearly twenty years the Bullion-Beck has been almost continually producing, although at times the grade of ore has been a very indifferent one. Recently some very high-grade material was uncovered, however, and with that added to the concentrates, its earnings have materially increased. The output at present averages 100 tons a day, and there is milling ore enough now blocked out upon which to run for an indefinite period.

From those professing to have been let into the secret, it was learned yesterday that Frank Rockefeller, Secretary Severance and others of the Standard Oil Company have finally concluded their search for a foothold in Utah, and that conservative investments had been made in at least two camps. At Mammoth the property acquired by them consists of the Black Jack and Trail, lying southeast of the Ajax, and worked in a superficial way many years ago. A group of mines is also understood to have been made at Clifton.

Bingham *Bulletin*: Samuel Newhouse, representing an English syndicate, has purchased the Henry M. group of ten claims on Carr fork. The Henry M. and Highland Boy have been largely developed and show ore blocked out of a gross value greater than the amount paid for the group stated at $200,000, while some are partially opened up and others mere prospects, but of much promise. With nearly 100,000 tons of ore in sight, the greatest depth of the vein thus far attained is 200 feet. Developments are now to begin which will give the group a common working tunnel and explore the main vein at a considerably greater depth.

The ore shipments from Bingham in September amounted to 2941 tons.

The product from the cyanide mill running in connection with the Niagara Company's mines is stated to be about $10,000 per month, treating 35 tons of ore per day.

IDAHO.

(Special Correspondence.) — On the Bond work is going on as usual, and at the present depth of the shaft (100 feet) the ore shows up better than ever. The owners are drifting from the 65-foot level, there being 18 inches of ore in the face of the north drift. The owners are building a new mill of five stamps, as the former mill was not of sufficient capacity to handle their output.

The Climax, owned by Shields & Walker, is at present employing twelve men, and they will increase their force in a few days to double that number. The tunnel is now in 220 feet, and it will tap the ledge in 20 feet at a depth of 170 feet. There is also a force of men employed sinking on ore, of which there is a number of tons extracted, which will average $100 per ton. The owners will put a mill on this property this fall.

The Best Chance is now working with eight men under the management of Dr. H. H. Bole. A mill test made on the ore recently was very satisfactory to the owners. The crosscut tunnel will tap the ledge in a few days. There is a considerable quantity of ore in sight that runs high, and, with a tunnel run through to the ore, the property will produce in a short time.

A mill will be put on the Frisco by the first of October.

We have plenty of prospectors and a number of would-be prospectors, but what the camp requires is capital. Placer mining in the past season was a financial failure with a few exceptions.

Pierce, Idaho, October 7, '96.

MONTANA.

Butte *Miner*: Preparations for opening up the Moonlight mine, recently purchased by the Washoe Copper Company, are being pushed forward with activity. The hoisting plant used formerly in the mine has been removed and a larger plant placed in position.

The Alice Company is working its property on the lease system, and there are about 120 men getting out ore.

A shipment of bullion silver and gold has been made from the Alice mine at Walkerville to San Francisco. The Alice is now producing over $50,000 a month in silver.

Word was received yesterday by the board of directors of the Flint Creek Mining Company that a rich strike had been made this week on the Flint Creek mine, twelve miles from Philipsburg, in Granite county.

Inter-Mountain: The Alta mine, at Corbin, has closed down probably for all time. This mine covers an immense mountain, into which a tunnel nearly 2000 feet in length has been run. The whole mountain has been honeycombed and every pound of ore taken out. A winze was sunk to a depth of about 1000 feet in the hope of uncovering more, but it is said none was found, and the company has decided to close down the property. A new plant, built to treat several million tons of tailings, will soon be in operation.

COLORADO.

Denver *Republican*: At Cripple Creek the production of the Portland Company's properties during September was between 1800 and 2000 tons.

The Mount Rosa Company, which has declared a $5000 dividend, has $65,000 in the treasury.

The Trail on Bull hill shipped 200 tons of smelting ore this month from the 300-foot level. A permanent shaft house and ore bins will be built in preparation for winter, and the property will be thereafter worked on a large scale.

The Arcadia Company is now shipping the ore that accumulated under the restraining injunction, and expects to realize about $12,000 from the sale. The miners will be paid up and the residue, if any, deposited with the Court, pending the final adjudication of its adverse suit with the Marinette Company.

W. S. Stratton moved a discarded steam plant from the Independence into the main shaft house on the Plymouth Rock and will continue development of the ground contiguous to the Ironclad.

The Enterprise is crosscutting into Raven hill 100 feet from the 200-foot station. No ore is being produced from the systematic workings, but an occasional shipment is made from the old quarry-like opening on the surface. There is evidence of a big vein in the ground.

The Ingham Company has temporarily abandoned the old workings on Raven hill and is sinking a new shaft on the Mattie D. to exploit a vein cut in the tunnel.

The Independence mill is running again in the preliminary test of the new machinery.

The Christmas on Legal Tender hill is getting out about fifty tons of $53 ore a week.

The output from the Theresa last month exceeded that of August by 20 tons. The completion of the new shaft and surface improvements has led to an increase in the working force, and production will be much heavier from now on.

James M. Childs and M. A. Fyke have taken a $20,000 bond and lease for twenty months on the Colorado King, located on the west slope of Gold hill, just above Cripple Creek.

The aggregate production from the Elkton for the past month will be about $30,000 net, with an expense of probably $10,000. The output was seven cars of first grade, nine of second and eighteen of third, making about 500 tons of smelting ore in all.

Cripple Creek *Mail*: Listed companies in Cripple Creek are paying $100,500 a month in dividends, with the Doctor, Independence, Gold King, El Paso and Strong - unlisted profit earners - doing fully as much. But for the accumulation of reserve funds the dividends for October from the listed stocks alone would probably reach $170,500, divided as follows: Anchoria-Leland, $18,000; Moon-Anchor, $12,000; Portland, $60,000; Isabella, $22,500; Elkton, $25,000; Union, $12,000; Victor, $30,000.

SOUTH DAKOTA.

Black Hills *Times*: For several months past rumors have been rife in regard to the sale of the Haggin and Hearst interest in the Homestake properties. A few days ago a telegram in the eastern papers announced that the sale had been made through Hamilton Smith, the South Africa mining expert, to the Rothchilds syndicate, the reported price being from $5,000,000 to $10,000,000. About three months ago one of our residents was in New York city, and was informed there of the pending deal, the reason given for the sale being the serious illness of Mr. Haggin, who was desirous of placing his estate in such shape as to prevent litigation in case of his death. His interests and that of the Hearst estate being so intimately combined that it was almost impossible to make equitable division, both parties agreed to dispose of them. Some foundation is given to the report by local stockholders, who have wired the New York office, and the departure of T. J. Grier, superintendent of the company, and Judge Moody, its local attorney, for New York, accompanied by Jas. Milliken, of Philadelphia, owner of the Milliken Park group of mines, adjoining the Homestead property, and C. L. Woods, of Rapid City.

At the New York group the contractors now at work sinking a 100-foot shaft have reached a depth of 86 feet, the last 16 feet being in a solid body of iron pyrite. Above it the shaft is all in a mixture of quartz and talcose slate carrying an average value of $3 per ton. This new shaft was started with a view of intersecting the main vein exposed in the old workings 80 feet west.

The Wide World group of claims, situated on the easterly slope of Custer Peak, are being prospected and developed by the Pittsburg, Pa., parties to whom the group is under bond for a reasonable sum.

Considerable excitement has prevailed in Spearfish during the past few days over reported rich strikes in the West carbonate country. It is said that the whole Spearfish canyon has been located and staked from the chlorination plant to the Spearfish falls.

NEW MEXICO.

Silver City *Enterprise*: At Pinos Altos A. Hersberger is working ten men on his Western mine. He is running a crosscut from the 300-foot level to intersect a parallel vein to the Western.

The shaft on the Golden Giant mine has attained a depth of 400 feet. As soon as the shaft has reached the 450-foot level, drifts will be run north and south upon the vein. The vein continues to improve in size and quality of ore as depth is attained.

On the west side of the Pinos Altos range, Frank Brennan is developing the Talcose mine, a great vein belonging to the Dorsey group.

Superintendent Chandler is working fifteen men on the Mountain Key.

At Gold Hill, Dr. G. N. Wood has purchased the Bragaw & Potter stamp mill to crush ore from his several gold properties.

The Gold Mountain Mining Company has temporarily suspended operations on its properties.

The Southwestern Coal and Iron Company are shipping iron steadily from the Santa Rita and Hanover gulches.

John H. Bragaw will ship a sample lot from his copper mine, at Hanover, to the reduction works. If the ore is found to be of sufficiently high grade, twenty-five or thirty men will be put to work at once.

At Mogollon the Confidence mill has suspended operations temporarily, until the new tramway is completed. It is reported that a pipe line will be built up Whitewater canyon to supply water power for the mill before starting up again; and that the number of stamps in the mill will be increased.

The Little Fanny and Maud S. mines still remain closed down and will probably not resume operations till after the election.

ARIZONA.

Yuma *Sentinel*: The rich strikes made in the White Gold basin at Picacho are growing better.

In the new tunnel on the Noonday mine the rich ore has widened out from 2 to 6 feet with an average of over $100 per ton. The balance of the 20 feet of ore which the tunnel cuts runs from $10 to $15, with an average of $12 per ton in free gold.

In the Sambrano shaft the pay ore, which was 2 feet wide, is filling the shaft, 6½ feet; but what is considered the best strike yet made was struck in the old tunnel by Andres Villa. The whole shaft, 4½x6 feet, is in the richest ore ever found at Picacho. All three of these finds, which are on three different veins of ore, are within 1000 feet of the Golden Dream Company's new mill.

The crosscut in the Little Frank is 46 feet in length in good milling ore, while that in the Goldem Dream is 44 feet in good free-milling ore. The company have 25 men at work opening up these new finds.

Mohave County *Miner*: Supt. Koster has men at work on the Norma vein, and has just tapped a chute of 1200-ounce silver ore on the 200 level. On the 100 level good ore is being obtained, and milling ore of a good grade is being sent to the surface from the 300 level. Men have also been put to work on the Eureka and the mine recently purchased from A. L. McKesson.

In the Horn Silver and Occident big bodies of good ore are being found. As work on the mine progresses, it becomes apparent that the ledges between the walls have not been thoroughly exploited.

The White Hills Company has struck a good body of ore in the hanging wall of the G. A. R. mine. The ore was passed in sinking in the main shaft, but afterwards a feeder was found that led to the discovery.

Prescott *Journal-Miner*: Since commencing work on the Gold Note and Surprise mines, D. B. Gillett has had 1305 feet of development work done on the two claims in sinking and drifting. Both properties are looking well.

Machinery for the Planet-Saturn Company has commenced to arrive at Fool's gulch. They have contracted for the transportation of 200,000 pounds of machinery, in addition to a large amount of brick and lumber.

The sale of the Silver Flake mine, six miles south of Prescott, has been completed by the payment of the balance of the purchase price by Mackin and Philbin. The consideration is $33,600.

E. V. B. Hoes has deeded a number of mining claims to the Treasure Mountain Mining Company. The claims are located between the Last Chance mine and Granite mountain.

Prescott *Courier*: The last payment on the purchase price of $33,600 has been made on the Silver Flake mine by Messrs. Mackin & Philbin.

A shipment of ore which goes $140 per ton, gold, is being made from the Annie mine, Chaparral.

Good reports come from the Lottie mine, Big Bug district, where a winze is being driven, from the lower level, on a vein two feet in width, which averages one ounce gold per ton and 20 per cent copper.

Reports of a rich strike come from the Peck mine, in which, 30 feet from the main ledge is a 10-inch streak of ore which runs 700 ounces silver per ton; then 100 feet from the main ledge is another streak of ore which runs 2200 ounces; these ore bodies lie in a crosscut from the 250-foot level.

SOUTH AFRICA.

Hennen Jennings, consulting engineer of the Henry Nourse Gold Mining Company, in his annual report gives some data of value as to the treatment of tailings. He says: The system of double treatment of cyanide has been in operation, and during the last eight months the classified products have been treated separately, and all practical details may be summarized as follows: The pulp leaving the mill assayed 6.61 dwts. per ton; of this, 47,086 tons of classified sands assaying 6.8 dwts. per ton, 3,870 tons of concentrates 19.8 per ton, which yielded 13,389 ozs. fine gold, value £53,003 4s 10d, at a cost (equal to 5s per ton) of £12,894 3s 10d, leaving a profit of £40,109 1s.

The gold produced represents an extraction of 66 per cent of the contents of the product treated. About 70 per cent of the mill pulp has been treated, and 57 per cent of its gold contents recovered. The slimes stored have an average assay value of 3.82 dwts. per ton. The working costs have been reduced from 8s 9d to about 4s per ton, working on the basis of 60 stamps. A small extension of these works is in progress by which we can obtain a higher gold extraction. Summarizing results from both processes, the average value of milling ore was 70s 6d per ton, of this the mill recovered 62 per cent; cyanide works recovered 20 per cent. Total recovery 82 per cent.

Books Received.

We have received a handbook on "Mines, Miners and Minerals of Utah," by H. W. B. Kantner, which is a timely review of the present condition of the mining industry of that State. In no great mining field has there been greater advances made during the past two years than in Utah, and all the literature published before that time would give little idea of the work going on in that State at the present time. Published by R. W. Sloan, Salt Lake City, Utah.

The Justinian Caire Company has published a catalogue of assayers' materials, laboratory glassware, mine and mill supplies, battery screens, etc., which will be of use to many in gaining an idea of the many new articles which have been brought out to meet the growing wants. It is a profusely illustrated volume of 250 pages. Published by The Justinian Caire Company, 521 Market St., San Francisco, Cal.

A Handbook on Rocks, by Professor J. F. Kemp of the Columbia School of Mines, New York, has been received. In this work Professor Kemp describes the different varieties of rocks, so as to make them recognizable without a microscope, and for the use of those who have need of such knowledge, but have not the opportunities and knowledge required for making a thorough and scientific investigation. He makes use of the old division of rocks into igneous and sedimentary and metamorphic, and describes each further division with much detail. In this short work Professor Kemp has attempted to popularize a very technical subject. The book is intended as a guide to rock determination without a microscope. He is to be complimented upon the arrangement of the work and the care in its compilation. It is particularly valuable in this country, because the instances cited are nearly all American. For sale by K. K. Taylor, Postoffice station J, New York city; price, $1.50.

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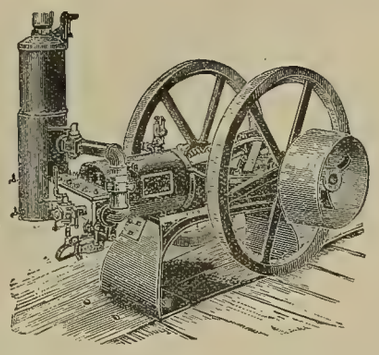

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Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c	65

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1¼c per horse power per hour; and on gasoline, 2½c per horse power per hour.

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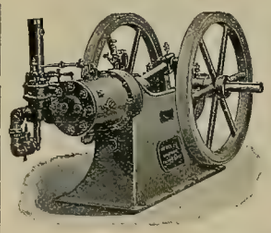

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Now, if you were using coal for steam purposes, which would you buy, clean coal at $6.00 per ton or coal which was 60 per cent stones and slate at $3.00 per ton, even if you could sell a load of stones, say for ballast, once in a while? We admit that gas engines will run on crude oil after a fashion, but the asphaltum cuts the cylinder, gums the valves and causes no end of trouble; besides the power obtained is much less, and **consequently you have to buy a larger engine than necessary—one-third larger.** Distillate oil is a product of asphaltum base—California crude oil—the distillate being obtained by evaporation, clean and clear without a trace of asphaltum in it. The price is only from 6½c to 9c per gallon, and every drop is fuel. No **"retail asphaltum or oil business"** about distillate: and

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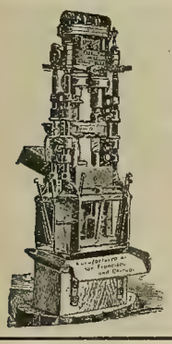

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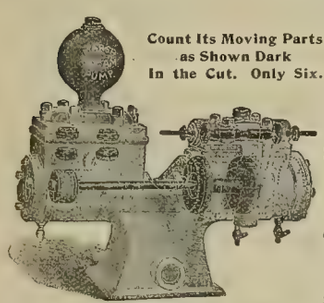

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Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City.

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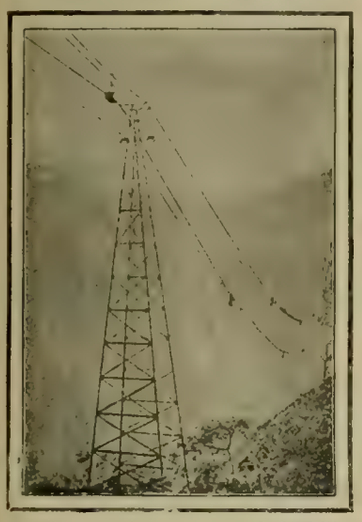

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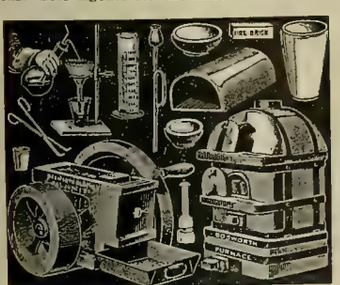

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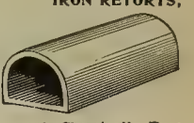

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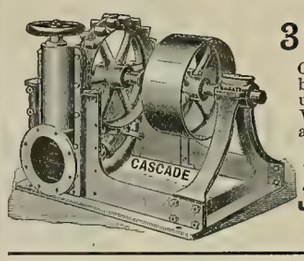

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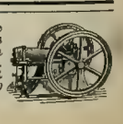

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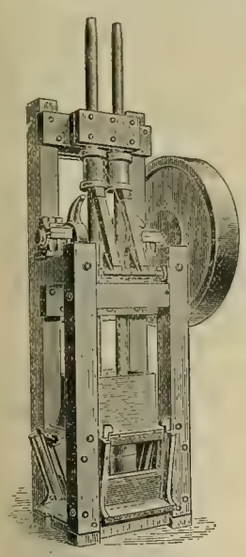

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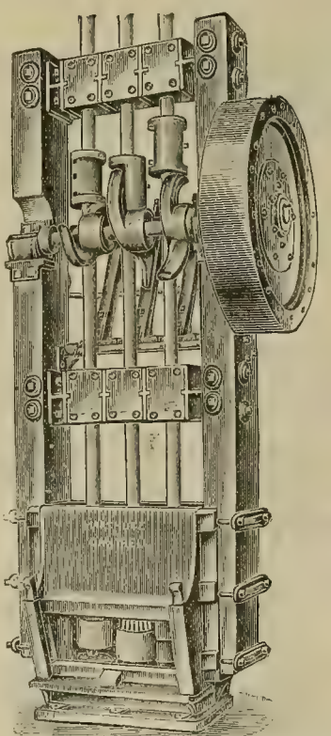

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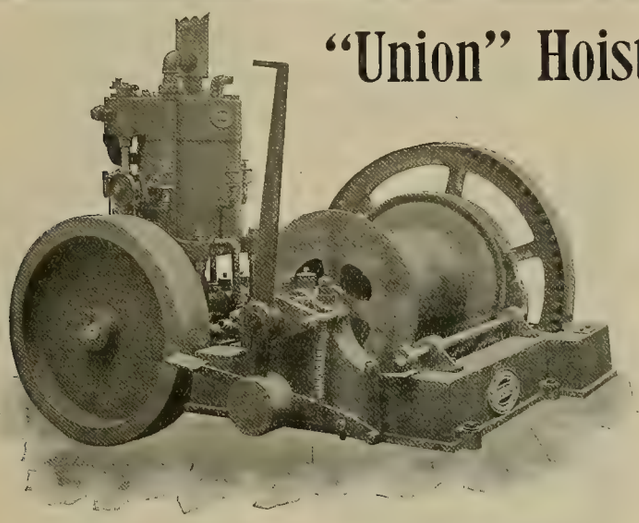

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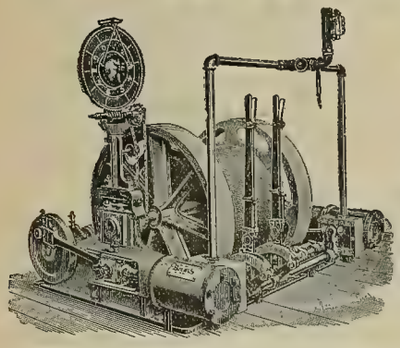

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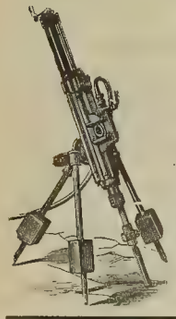

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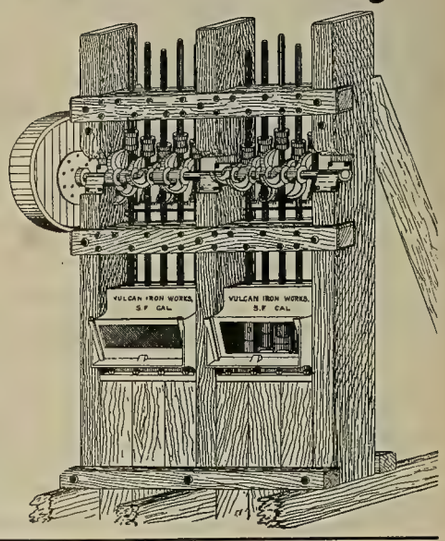

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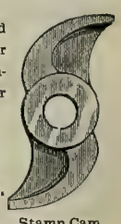

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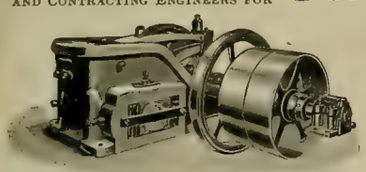

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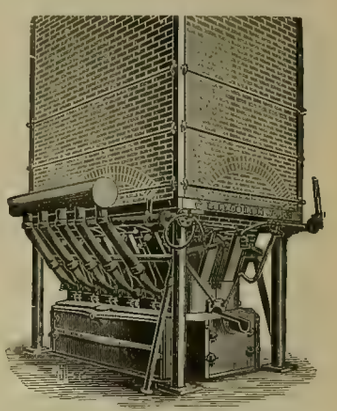

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Market Reports.

The Markets.

SAN FRANCISCO, Oct. 15, 1896.

Jobbers in almost every branch of trade report the volume of goods going out larger than at the corresponding time last year, but they also say that the buying is for actual requirements and largely of the hand-to-mouth character. It is not the retail trade that buy only for near-by wants, for jobbers pursue the same course and will continue to do so until after election and business assumes its normal condition. This conservative policy is putting the trade, wholesale and retail, in most excellent position to take advantage of any change which may take place following the election. The activity in farm products, with several lines selling at higher and remunerative prices, combined with a steady investment in gold mines and an influx of gold miners, are having a most decided beneficial effect, which will be more pronounced in 1897. Iron workers and manufacturers in general continue to report good business. Several have increased the number of hands, so pressing is the call for structural material and machinery of various kinds. The textile manufacturers report, as a rule, running on full time so as to meet the demand for some line of goods.

The local money market is essentially unchanged. The commercial banks are meeting, with some degree of liberality, all legitimate wants of regular customers, but will not seek new business until after election, preferring, at present, to carry a large surplus of funds. Savings banks are not making any new loans, but are calling in some that are maturing. Private parties are putting out more money on realty, taking advantage of the present situation to get as high a rate of interest as possible. Merchants, as a rule, report continued fair to free remittances from about all sections of the coast, which places them in easy position. Eastern money markets have been working closer, but with no apparent stringency reported. Quite a number of the New York banks have called in loans, yet the offerings of money by outside parties and banks have tended to counteract its effect.

A cablegram from London to a leading financial journal at New York states that in all of the large offices, inquiries in regard to American securities are the rule, and every American is closely quizzed in regard to the situation. Berlin has a very large amount of idle money, although business throughout Germany is good. The same thing is true of London and the larger cities in England, but the accumulation of idle capital is said to be unprecedented. Paris seems to care little or nothing about American securities, but the field is practically unlimited in London and Berlin.

New York Silver Prices.

NEW YORK, Oct. 15.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	29 15-16	64¾
Saturday	29 15-16	64¾
Monday	29⅞	64⅝
Tuesday	29¾	64⅝
Wednesday	29¾	64⅝
Thursday	29⅞	64⅝

	Copper.	Lead.	Iron.	Tin.
Friday	10 75	2 75	10 25@12 00	12 65
Saturday	10 75	2 75	10 25@12 00	12 65
Monday	10 75	2 75	10 25@12 00	12 65
Tuesday	10 75	2 75	10 25@12 00	12 65
Wednesday	10 75	2 75	10 25@12 00	12 65

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, ⅔ per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	Par
New York Telegraphic Transfer	.02½
London Bankers' 60 days	$4.82½
London Merchants	$4.81½
London Sight Bankers	$4.85
Refined Silver, per oz., 1000 fine	64⅝
Mexican Dollars	50½@51½

SILVER.—Contrary to general expectation, the markets at home and abroad sold lower the past week. At the declining prices, public advices state, there has been free selling by disgusted holders, who had bought at higher figures in expectation of better prices. Private advices are to the effect that strong parties have been for some time and are still buying, so as to better concentrate stocks—believing that higher prices will rule before long. The failure of the wheat crop in India has caused a light demand from that colony for silver, as has the stagnation of business in China. It is believed that with the coming year there will be a good demand from the Orient, India and Straits, which are large purchasers of the white metal. We are informed that there is a fair to good demand for legitimate trade wants, but a light inquiry for speculation. The export movements from this port in September were as follows: Hongkong, $191,000; Shanghai, $405,080; Bombay, $35,000; Central America, $103,000; total, $734,080.

MEXICAN DOLLARS.—The demand, although light, appears to be slowly increasing. The shipments in September were 90,652 to Hongkong and 9360 to Shanghai.

COPPER.—Although the markets at the East are reported easy, it is a well established fact that buyers have to pay full outside prices. The home demand is only fair, but the foreign demand continues liberal, which tends to keep supplies from accumulating.

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@16½

LEAD.—The market has ruled steady, with a tendency to firming up.

Our market is quoted as follows:

Pig	—	@	3 60
Bar	—	@	3 95
Sheet	—	@	5 25
Pipe	—	@	4 50

ANTIMONY.—The demand is fair, with the market steady at 7¾@8¼c in a jobbing way. New York mail advices quote 7¼ for Cookson's, 6½c for Hallett's and 6⅝c for Japanese, from store.

BORAX.—The general situation is practically unchanged.

The market is quoted as follows:

Refined, in car lots	6¼
Refined, in sacks	5¾
Powdered, in car lots	5¼
Concentrated, "	5¾

TIN.—For both pig and plate the demand is nominal, but the market seems to be steadier, in sympathy with a slightly better feeling abroad.

Pig, per lb			13¼
Plate, I C coke, heavy, per box	—	@	4 05
" " " light, "	—	@	3 95

POWDER.—There is a continued free demand.

The market is quoted as follows:

Hercules, No. 1, per pound	11¼c
" No. 2, "	8½c

IRON.—The consumption in this city is said to be fair, with a large increase looked for next year. At the East the markets appear to be steadier.

QUICKSILVER.—There is a good call on both home and export account. The exports by sea from this port for the first nine months of the calendar year aggregate, in flasks, 10,100, against 10,181 in 1895. The receipts at this city during that time aggregate 20,581 flasks, against 23,994 flasks in 1895.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

SHOT.—There is nothing new to report.

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

COAL. — The market is still in buyers' favor for cargoes in all positions. The consumption is steadily increasing, but the offerings are liberal.

COKE.—The market is quoted as follows:

Gas Companies'	—		—
English, to load	8 00	@	—
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	—
Cumberland	—	@	—

NAILS.—The market is unchanged. The demand is good.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

LUMBER.—The demand is fair for home and export.

Redwood, Fluming	17 00	@	—
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

Mining Share Market.

SAN FRANCISCO, Oct. 15, 1896.

Prices held fairly steady up to Monday, when an easier tone developed, which resulted in shading prices as the day passed. Tuesday the tone was still easier, which brought out selling orders from holders. Chollar sold at $1.85 and Con. Virginia at $1.60. The Gold Hill shares sold down, also. At the day's closing Chollar strengthened to $1.90, but other shares were barely steady. Yesterday morning Best & Belcher firmed up slightly; but with the announcement that Challenge had been assessed 10 cents, there was a weaker feeling, particularly in the Gold Hill shares. The weakening in the latter was largely due to outside selling, caused by the assessment on Challenge, for, with its being levied, holders who had bought in expectation of an upmove in that group, lost faith, which caused many to sell. The putting of more miners to work in Crown Point and Belcher has not had the effect looked for by outsiders, while the work on the Brunswick lode has not turned out as good as had been expected, judging from the way in which the market for Chollar shares have acted—going down, instead of up. Trading throughout the week has been light, barely enough business passing to pay office expenses of two large firms, let alone of twenty or more. The number of persons going into the boards and those visiting tickers to see prices has dwindled to very small proportions. From the action of the market, it looks as if moneyed insiders are not paying any attention to it, but leaving it to the mercy of small pools and reckless chippers. While not taking an active interest in the game, it is not at all unlikely but they may be buying at declining prices, so as not to let prices go entirely out of sight. In doing this they can the better freeze out outside holders, if it is so desired by them. Among a large class of operators the opinion prevails that there will be no marked activity, outside of one or two spasmodic moves, in the market until after election. They claim that moneyed operators are devoting their time to local and national politics and therefore cannot give attention to mining shares, while outsiders are gradually drawing out of the market, a large majority of whom are operating in wheat futures and in New York railroad and industrial stocks, owing to lively fluctuations in prices.

The news from the Comstock mines is essentially unchanged since last week's advices. The work in several seems to be pushed with more vigor, particularly in the Gold Hill group. In the latter they have made prepations to extract more ore from two or more of them, while at the same time pushing dead and exploiting work. Con. Virginia commenced shipping ore to the mill yesterday, which started up on it to-day. Unless an increased number of tons of ore, and of higher grade, can be extracted, the company will run behind owing to the heavy expense incurred prosecuting work on the Comstock and Brunswick lodes. In Andes they struck a strong flow of water on the 420-foot level, which will have to run off before pushing work in that direction. In Utah the work is on the same level and in the same direction heretofore published. The material was, at last advices, looking better. In Sierra Nevada and Union the work is reported essentially unchanged. In Mexican work is still continued to the west on the 1000-foot level. The formation is about the same as reported last week. The work in Ophir is on the Central Tunnel and 1000-foot levels. In prosecuting the work it is said that all favorable prospects are being followed up. In Con. Virginia they are upraising in favorable formation from the 1000-foot level. On the 1650-foot level the east crossdrift near Best & Belcher is being pushed ahead, while from the work on the 1750-foot level ore is raised. Last week 169 tons, assaying about $50 a ton, were raised to the surface. Work is continued in the Gould & Curry and Best & Belcher east crossdrift from the Bonner shaft. The material encountered does not show any particular change since our last advices. In Savage active work is under way on several levels, with nothing new to report. Advices from the work in Hale & Norcross are not quite so favorable. From Chollar, Potosi and Bullion our advices are about the same as given last week. In Alpha work is still continued in the workings on the 500-foot level. The west crossdrifts in Con. Imperial are pushed slowly ahead, with no essential change reported in the formation. Work is to be resumed before long in Challenge. In prosecuting the work in Confidence a few tons of fair-grade ore, assaying $23 a ton, are raised each week. Information from Yellow Jacket is hard to get. Work in Kentuck has not been resumed, and probably will not be until the treasury shares have been sold in the market or otherwise. In Crown Point active work is under way on two or three levels. They are milling the gold ore which is raised each week. The assays are said to be around $9 to $12 a ton, but no official advices of it have as yet been made public. The output of ore by Belcher shows a slight increase. The grade is about the same as that heretofore taken out. Seg. Belcher and Overman continue to raise some ore each week. In the Alta group there is nothing new to report. The levying of an assessment by Justice would seem to indicate more activity in that mine before long.

The attention of dealers is still centered on work on the Brunswick lode. In Occidental it is being pushed on several levels. An improvement is reported, which imparted more life yesterday to the shares and caused them to sell higher. That in Chollar, on the 300-foot level, is said to be disappointing, but as they have to run some 30 or 40 feet in the crossdrift before they expect to cut the downward continuation of the ore found above, they may yet find something of importance. It is calculated that the Norcross-Chollar south drift on the 400-foot level will be to the Chollar north line by Sunday; when this objective point has been reached the management will take up the work, but whether it will be run for the ore found above or run it as now, along the footwall, is an open question. It is stated that the coming week a crossdrift will be started by Hale & Norcross on the 400-foot level near the Chollar line for the purpose of running for the ore on the 300-foot level. The other work in that mine, and also that in Savage, Gould & Curry, Best & Belcher and Con. Virginia, is continued in the directions heretofore published in this department.

The market opened this morning dull and heavy. After the regular call the tendency was to lower prices with outsiders letting go. The closing at noon was weak and inactive. At the 2:30 P. M. session there was a genuine boom, with Hale & Norcross and Chollar the leaders. The advance in them was 50 per cent on the morning sales. The cause for the upmove no one on the outside seems to know. The general opinion is that quite a line of shorts has accumulated and the quick move was made so as make them fill at an advance. So far as the writer is able to learn there is quite an improvement in Chollar on the Comstock lode. But there are reports that the Chollar crossdrift on the 300-foot level Brunswick lode is in ore, and there is still another that in the Hale & Norcross winze on that lode they have struck ore, while some say that there has been quite an improvement in the upraise in Con. Virginia on the Comstock lode. Let it be what it may, the short sellers can have the pleasure of filling at a loss.

The following illustrates the changes of the week:

MINES.	Oct. 8.	Oct. 15.
Alpha		$ 13
Alta Consolidated	$ 14	
Andes		28
Belcher	62	66
Best & Belcher	96	1 20
Bodie		52
Bullion		23
Challenge	50	46
Chollar	2 20	2 70
Confidence		1 45
Consolidated California and Virginia	1 75	2 00
Consolidated New York		
Crown Point		57
Exchequer		04
Gould & Curry	74	94
Hale & Norcross	1 45	1 90
Justice		05
Mexican		55
Ophir	1 20	1 50
Overman	15	18
Potosi	76	85
Savage	51	85
Sierra Nevada	71	74
Union	60	61
Utah	07	10
Yellow Jacket	31	62

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24	Sept 24..Oct 24	E D Farish, 632 Market
Bay State M & D Co, Cal	33	3c	Aug 21	Sept 30..Oct 20	F E Luty, 330 Pine
Central Eureka	3	2c	Sept 3	Oct 10..Nov 2	Wm A M Van Bokkelen, 320 Sansome
Challenge Con M Co	22	10c	Oct 14	Nov 17..Dec 8	C L McCoy, Mills Bldg
Channel Bend M Co	4	2c	Sept 14	Oct 16..Nov 7	J P Langhorne, 39 Sutter
De Soto G M Co	1	7c	Sept 7	Oct 10..Nov 9	E H Clark, Mills Bldg
Goleta M Co	4	20c	Sept 21	Nov 2..Dec 2	D M Kent, 330 Pine
Quaker G M Co	40	12c	Sept 7	Oct 8..Nov 5	C W Poindexter, 418-420 Market
Gould & Curry S M Co, Nev	79	15c	Sept 1	Oct 5..Oct 27	A K Durbrow, 309 Montgomery
Marguerite G M & M Co	4	20c	Sept 21	Nov 10..Dec 15	Chas Peach, 237 12th
Mexican G & S M Co	55	20c	Oct 9	Nov 12..Dec 3	Chas E Elliott, Nevada Block
Montecito M Co	3	15c	Sept 21	Nov 2..Dec 2	D M Kent, 330 Pine
Occidental Con M Co, Nev	24	10c	Sept 2	Oct 8..Oct 29	A K Durbrow, 309 Montgomery
Potosi M Co, Nev	46	25c	Sept 28	Nov 4..Nov 24	Chas E Elliott, Nevada Block
Savage M Co	90	20c	Oct 2	Nov 4..Nov 24	E B Holmes, Nevada Block
Sterling M Co	3	15c	Sept 21	Nov 2..Dec 2	D M ent, 330 Pine
Sumdum Chief M Co	1	15c	Sept 2	Oct 19..Nov 5	H G Stevenson, Hobart Bldg
Troy M & Dev Co	1	12½c	Sept 7	Oct 14..Nov 7	Otto Ryst, 525 Front
Union Con S M Co, Nev	53	20c	Aug 25	Sept 28..Oct 22	A P Swain, 309 Montgomery
Utah Con M Co	23	5c	Sept 10	Oct 13..Nov 2	A W Havens, Nevada Block
Yellow Jacket S M Co	61	25c	Sept 11	Oct 15..Nov 20	W H Blauvelt, Mills Bldg

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Anchor Coal and Development Co	E D Farish, 632 Market	Oct 20
Con Cal & Va M Co	A W Havens, Nevada Block	Oct 19

San Francisco Stock Board Sales.

SAN FRANCISCO, October 15, 1896.

9:30 A. M. SESSION.

100 Alpha	13	1000 Occidental	56
200 Best & Belcher	90	200 Ophir	1 20
400 Challenge	46	400 Overman	16
50 Chollar	1 90	100 Potosi	64
500 Con Imperial	02	100 Savage	46
200 Crown Point	52	100 Seg Belcher	08
100 Justice	05	200 Sierra Nevada	68
200 Mexican	41	300 Yellow Jacket	57

SECOND SESSION—2:30 P. M.

1350 Ophir	1 50	150 Confidence	1 45
1000 Mexican	55	700 Sierra Nevada	74
1300 Gould & Curry	94	350 Utah	10
1100 Best & Belcher	1 20	300 Bullion	23
1700 Con Cal & Va	2 00	100 Exchequer	04
2150 Savage	85	400 Overman	18
1010 Chollar	2 70	1300 Union	61
650 Potosi	85	250 Caledonia	14
1600 H. & N	1 90	500 Occidental	60
900 Crown Point	57	800 Andes	28
1000 Yellow Jacket	62	100 Bodie	52
100 Belcher	66	500 N. G. & C	08

THE SANTA ROSA GOLD MINING COMPANY.

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Investigate carefully; hesitate before buying other stocks; consider SANTA ROSA and know why you don't want it.

Call, write or telegraph to F. H. PETTINGELL, 10-11 Bank Block, Colorado Springs, Colo.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from W. H. Allbright, in his mine near Placerville, El Dorado Co., to deposit tailings in a ravine below the mine; from W. P. Miller, in the Wild Cat Mine, near Montezuma Hill, Nevada Co., to deposit tailings in Blind Shady Creek; from John Freeman, in the Burlington Mine, near Logansville, Sierra Co., to deposit tailings in Nigger Creek; from Isaac Blomquist, in the Little Boulder Creek Mine, near Sierraville, Sierra Co., to deposit tailings in a ravine below the mine; from Hall & French, in their mine near French Corral, Nevada Co., to deposit tailings in an old pit; from Moulton & Eckman, in their mine near French Corral, Nevada Co., to deposit tailings in an old pit; from David Corbett, in the Linda Placer Mine, near Gibsonville, Sierra Co., to deposit tailings on a flat; and from James E. Roelke, in the Divide mine, near Kelsey, El Dorado Co., to deposit tailings in a ravine below the mine—gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on November 2, 1896, at 1:30 P. M.

The Jno. G. Morgan Brokerage Company,

BANKERS and..... BROKERS,

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THE total output of coal from the collieries in the South African Republic in 1895 amounted to 1,152,206 tons—an increase of about 400,000 tons over 1894.

THE CALIFORNIA MINERS' ASSOCIATION will hold its annual convention in this city November 10th. This will doubtless draw large numbers of mining men and others to the city, many of whom will improve the opportunity to make purchases. Where the buyers' wants include furniture, here is a straight pointer: You can save money and get first-class goods, while dealing with a first-class house, by going to the California Furniture Co., No. 117 Geary street.

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VIA
UNION PACIFIC
Only 3 1-2 Days to Chicago-----3 1-2.
Only 4 1-2 Days to New York---4 1-2.

The Union Pacific is the only line running Pullman double Drawing-Room sleepers and Dining Cars San Francisco to Chicago daily without change. Only one change to New York; dining car service entire distance. Vestibuled composite buffet smoking and library cars between Ogden and Chicago.

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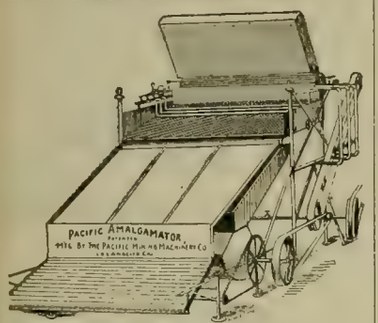

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FOR SALE.

Gold Mining Property,

Situated in the Silver Peak and Red Mountain Mining District, Esmeralda County, Nevada, the property of James O'Hale, deceased, comprising three claims well developed, mill site and spring, 2-stamp mill, engine (6 H. P.) and boiler, complete set of tanks and all requisites for cyanide process, mining tools, horse and wagon, two sets of harness, comfortable house—all to be sold as a going concern. Offers will be received by STAFFORD O'NEILL, postoffice address Silver Peak, Esmeralda County, Nevada.

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Assessment Notice.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business San Francisco, California. location of works, Auburn, Placer county.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-first (21) day of September, 1896, an assessment (No. 4) of twenty (20) cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, 257 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on TUESDAY, December 15, 1896 to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. PEACH, Secretary.

Office—257 12th street San Francisco, Cal. Office hours from 4 to 6 o'clock P. M.

CHALLENGE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 14th day of October, 1896 an assessment (No. 22) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 35, third floor Mills building, corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of November, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on TUESDAY, the 8th day of December, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. McCOY, Secretary.

Office Room 35, third floor Mills building, corner Bush and Montgomery streets, San Francisco, California.

DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Cert.	No. Shares.	Amt.
E. C. Cain	170	2,500	50 00
E. C. Cain	171	2,500	50 00
C. L. Dingley, Jr.	72	800	16 00
C. L. Dingley, Jr.	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	169	3,803	76 06
E. C. Godfrey, Trustee	160	6,667	133 34
E. C. Godfrey, Trustee	166	1,333	26 64
E. C. Godfrey, Trustee	167	1,809	36 18
E. C. Godfrey, Trustee	141	1,667	33 34
E. C. Godfrey, Trustee	142	3,000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	83	2,000	40 00
J. F. R. Landis	138	1,000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6,000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2,500	50 00
Jos. A. Pratt	2	2,500	50 00
Jos. A. Pratt	3	2,500	50 00
Jos. A. Pratt	54	2,500	50 00
John E. Todd	5	2,500	50 00
John E. Todd	6	2,500	50 00
John E. Todd	9	2,500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until WEDNESDAY, October 21st, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California. E. C. GODFREY, Secretary.

DELINQUENT SALE NOTICE.

ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California; location of works, Kelso, Cowlitz county, Washington.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 7) levied on the Twenty-fourth (24th) day of August, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
Mrs. Edith Grey	222	100	3 00
Mrs. Edith Grey	223	100	3 00
R. M. Woodford	559	100	3 00
Jas. E. Ager, Trustee	651	500	15 00
W. H. Gregory	688	500	15 00
W. H. Gregory	689	500	15 00
W. H. Gregory	697	500	15 00
F. M. Meigs	848	350	10 00

And in accordance with law, and an order from the Board of Directors, made on the 24th day of August, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room 5, 632 Market St., San Francisco, California, on SATURDAY, the 24th day of October, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. D. FARISH, Secretary.

Office—No. 632 Market Street, Room 5, San Francisco, California.

ANNUAL MEETING.—The Annual Meeting of the stockholders of the Anchor Coal and Development Company will be held at the office of the Company, No. 632 Market St., room 5, San Francisco, California, on TUESDAY, the 20th day of October, 1896, at 1 o'clock P. M., for the purpose of electing a Board of Directors for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, October 17th, at 12 o'clock M.

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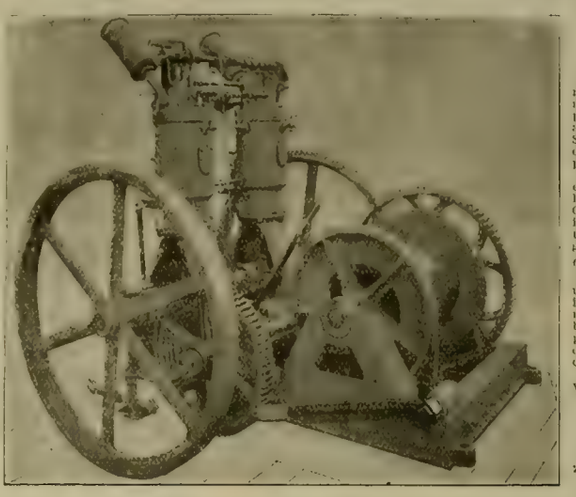

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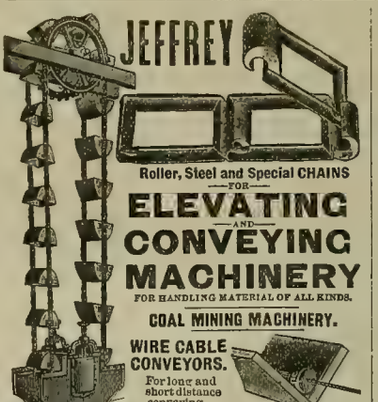

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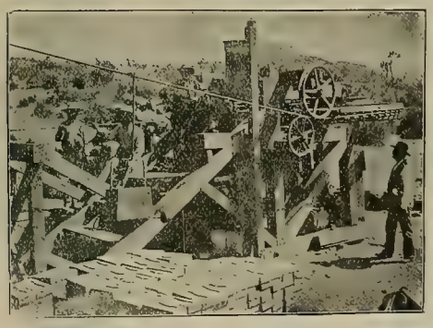

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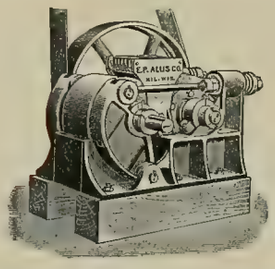

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The Forestry Commission.

The work of the United States Forestry Commission in the field has been completed. They have finished their summer tour in which they viewed the national parks, reservations and all the leading forest districts of this western country. Their report, which will be issued within a few months, can-not fail to be of great importance to the public. The need is recognized of forest preservation and of a permanent policy in regard to forests on the part of the Federal Government.

Members of the Commission state that everything they saw made more and more apparent the need of forest supervision on account of the great fires they witnessed and of the immense amount of absolute and at times almost wanton destruction by the hand of men. The forests have not been used wisely at all, but simply destroyed.

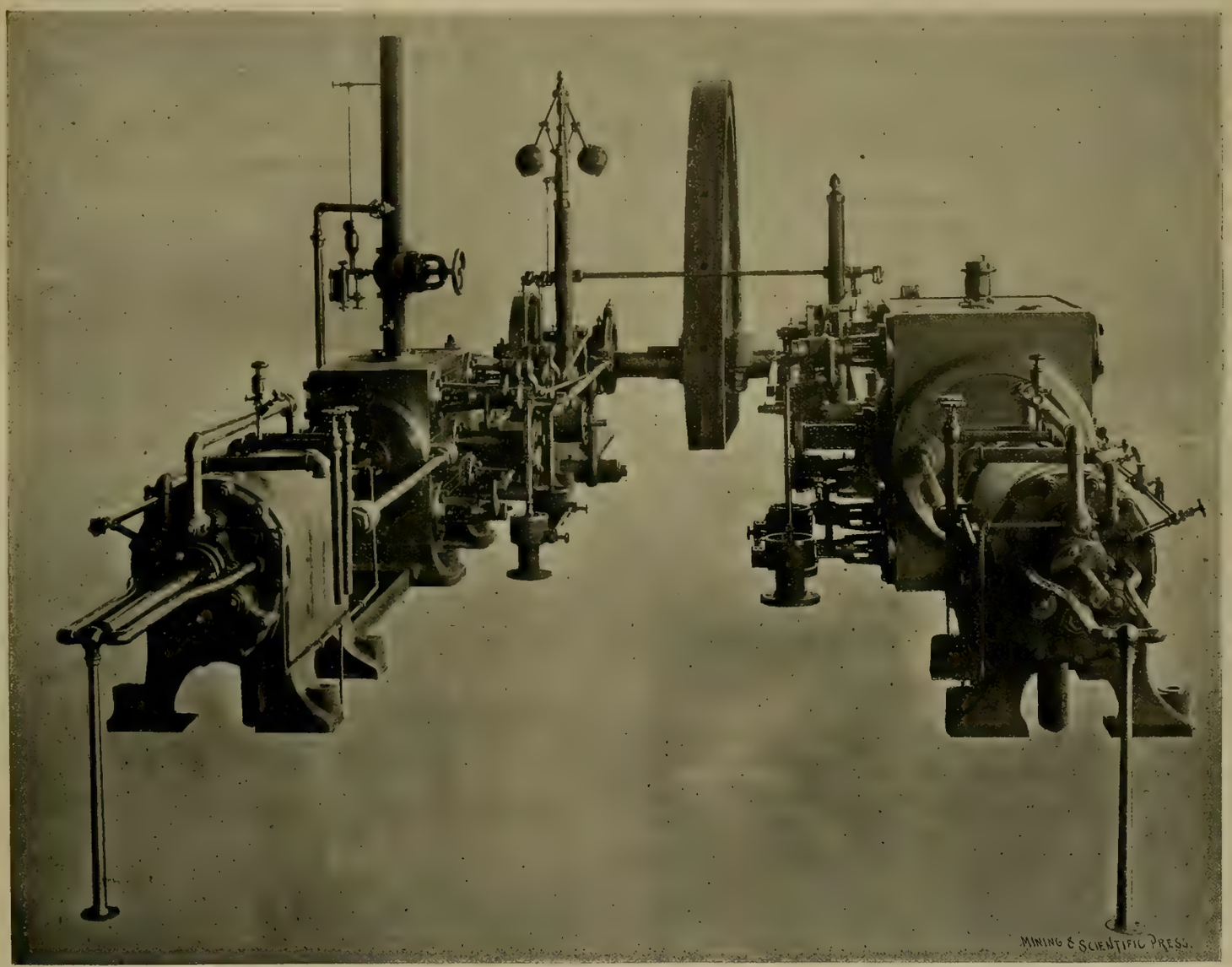
The object of the Commission, of course, is to discover by what methods the forests can best be made use of without total destruction. The forests still left are capable of producing perennial harvests for every proper use without such destruction. A very important object in the preservation of the forests is the protection of the sources of the streams.

The appointment of this Commission, at the request of the Secretary of the Interior, was the first step taken by the Government toward getting the forestry administration put on a definite working basis. No true friend of the forests nor any one of the Commissioners had the slightest thought of withdrawing any of the forests from use. It is not their desire to prevent timber from being cut, but to see that it is cut in such a way as to still preserve the forests for future generations and at the same time guard the watersheds. This is a matter of great importance for the mining industry in this State. Its welfare will depend much upon cheap and abundant timber and water power.

An Air Compressor for Montana.

The good work done in mining machinery by the San Francisco foundries is shown by the large orders filled for distant points in competition with the East.

We illustrate on this page an air compressor recently built for the Boston & Montana Company's Leonard shaft in Butte, Montana. It is a 20-drill machine with cross compound Corliss steam cylinder and the Risdon patent ring inlet air cylinders, with their new patent unloading device. This machine is a model of its kind, and is one of the highest class air compressors ever built. The air cylinders have a single inlet valve in each head of what is known as the ring inlet type. The water circulation is of the double system—that is, taking two streams of water and distributing same through walls and heads of cylinders. It will be seen from the illustration herewith how complete the machine is. The Risdon Iron Works of this city are the builders.



AIR COMPRESSOR BUILT IN THIS CITY FOR THE BOSTON & MONTANA COMPANY, BUTTE, MONTANA.

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J. F. HALLORAN.....General Manager

San Francisco, October 24, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Air Compressor Built in This City for the Boston & Montana Company, Butte, Montana, 333. Manitou Tunnel Power Plant, 339.

EDITORIAL.—The Forestry Commission; An Air Compressor for Montana, 333. A Species of Blackmail; Relocators' Rights; The Geological Survey and New Mining Districts; The World's Gold Yield; Location Notices in California; The Miner and the Court, 334.

SCIENTIFIC PROGRESS.—Transcontinental Arc; Accuracy of Chemical Analysis; Impossibilities Made Possible, 338. Highest Meteorological Observatory in Europe; Solvent for Gold and Silver; Ordinary Gauge Glasses, 339.

ELECTRICAL PROGRESS.—Manitou Tunnel Power Plant; The French Motor-Car Demonstration, 339.

MECHANICAL PROGRESS.—Hoisting Six Barrels a Minute; The Utilization of Waste Slag; Nickel-Steel; Large Locomotive Industry in Russia, 339.

PRACTICAL INFORMATION.—A French Decision on Subsidence; Number of Postoffices in the United States; Benefits of Railroads; Exports of British Tinplate; Increased Area and Growth of Woodlands Throughout New England; Discovery of the Celebrated Leary Raft, Applications for the Granting of Mining Concessions by the Greek Government, 340.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 342-3.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 350.

MISCELLANEOUS.—Concentrates, 335. The Development of Colorado's Mining Industry, 336. Mine and Mill Reports; Gold Mining Coming to the Front; A Miners' Association Headquarters 337. Note on a Shaft Fire and Its Lesson, 338. Coast Industria Notes; Personal; Recently Declared Mining Divdends; Recent California Mining Incorporations, 341. Commercial Paragraphs; Recent Patents; Notices of Recent Patents, 344.

In a number of the older mining districts of this State there are men who make it a business to levy a species of blackmail that should be suppressed. It is their custom whenever a bona fide location is made, particularly by any one with means, to locate other claims all around for the purpose of cutting off opportunities for obtaining tunnel rights or other privileges necessary to working his property. This has become such a nuisance that in many districts it is necessary for a person to make many locations to protect one. The harpies do not do any assessment work, but, at the end of a year, if they still believe they may be able to levy tribute, have their claims relocated by partners in crime and so hold for another year.

Relocators' Rights.

On a very large proportion of the mining locations that have been made in this State the locators have done no assessment work; but with the revived interest in mining in many cases these men who have allowed their interests to lapse, come in and attempt to claim title over others who have come in later and located over their ground. The new locators are often in doubt as to the rights in the premises and we often receive communications asking whether the first locators have any rights, and if not, how they may be dispossessed of the property. In cases where they have taken to doing development or assessment work long after all other rights have passed away, they are simply trespassers.

One correspondent, who has located upon ground which had been previously located, but upon which no assessment work had been done for three years, asks what he should do in the premises. In earlier days a shotgun would probably have suggested itself to our correspondent, but that old custom has passed away and the lawyer has taken the place of the shotgun. We can only advise him to consult his attorney. The other man is a trespasser simply, without any rights in the premises.

The Geological Survey and New Mining Districts.

There has been of late a commendable activity on the part of the United States Geological Survey in the way of making timely examinations of new mining districts. A party of surveyors has lately returned from the Yukon country in Alaska. Others have been in the new districts in Utah and southern Nevada to look over the ground and determine what further work should be done. A member of the survey is on the same mission in the Black Hills. The reports upon the Mercur and Cripple Creek districts were of great value. These later reports should be published with less delay than has been the custom in the past. The report upon the Yukon placers will be looked for eagerly by many who have been attracted by news from that region, and it is to be hoped that it will appear in time for the opening up of next season. So far, information about the mines of that part of the country has been very contradictory. It will be greatly to the advantage of Alaska to have truthful reports made of the properties, whether they are favorable or not.

The World's Gold Yield.

The gold yield of 1895 was by far the largest in the history of the world—something over $200,000,000. Enough reports have been received from the different gold fields of the world to show that this will be considerably increased for 1896. With little exception, there will be an increase in all the large gold producing districts of the world, and many new districts which were hardly noticed before will come forward with large figures.

In California, throughout the entire gold region, there has been more activity and development than ever before. While this will not cause a large increase in the output of 1896 over that of 1895, for the reason that many of the mines being developed will not begin to produce bullion for one or two years, yet the newly opened mines and the large increase of activity will materially add to the bullion yield of last year. Much the same may be said of Colorado. The output of Cripple Creek promises to be about $2,000,000 more than that of last year. New gold mines have been opened in other parts of that State, and the total yield should be considerably increased.

Nevada has not been counted among the gold-producing States heretofore, but the opening up of the immensely rich mines about Pioche, State Line and smaller mines in other parts of the State promises to make the gold yield of that State of considerable importance. In Montana, Idaho, Wyoming and Colorado there has been a great deal of activity in gravel mining. Not enough has been done to make much addition to the gold yield of this year, but there can be little doubt that the gravel deposits in these States will in time yield large sums.

In Alaska there has been an increase of the gold yield, and there will be a greater increase next year. British Columbia will do more for the increase of this year's output than any other single new district. Further east, in the British possessions, new gold mines are being opened up. In South America there is some new interest in gravel mines. Several California engineers have been called there to take charge of or expert mines for British syndicates. In Australia activity in mining has been greater than ever before, and the output of gold should be larger than that of last year. In South Africa the output for the last two months is the largest on record. The output of the mines of Russia last year were estimated at $34,000,000, and there is more being done this year than there was last. Gold mines are being opened up in countries hitherto unknown as producers of the noble metal.

There can be little question that in nearly all these districts named the output of gold will increase for several years. The query then becomes, not as to whether there will be an abundant supply of gold for the next few years to come, but how long will it hold out.

The reduction of the cost of working and milling ores has been the cause of opening up many mines that would otherwise have remained untouched. Many reports are received of cases where the cost of both milling and mining is less than $2 a ton. The main problems for mining engineers will be in this direction. A small reduction in the cost means the opening up of many mines already known to exist that would otherwise remain valueless. In South Africa, for example, of the numerous parallel reefs, as they are called, at first only one—the richest—was worked; now two, and sometimes three or more are opened. A large majority of these reefs are of such low ground that with present methods they cannot be worked, and the question as to how much the future output will be depends entirely upon the reduction in the cost of the working.

Location Notices in California.

The want of State laws to supplement federal statutes and rulings of the general land office has caused much confusion as to what is necessary in making locations of mining claims. We are continually in receipt of queries on this subject and many of them will be answered by the following valuable hints about the location notice which Mr. A. H. Ricketts of this city has written for us.

A location notice can be written or printed upon paper, cloth or parchment.

It can be cut or engraved upon wood, stone or any metallic substance, or be painted upon a board.

Aniline inks quickly fade upon exposure to the elements. Hence, a posted notice should not be written with red ink or upon the typewriter.

An exposed notice of location which is written with a lead pencil will remain legible longer than one written with ink.

There is no legal reason why a location notice should not be written with a lead pencil.

It will be presumed that every locator is a citizen of the United States. Hence, it is unnecessary to state the fact of citizenship in the location notice.

It is unnecessary to make any allusion in the notice of location to the age or sex of the locator.

A minor, a female or a corporation can make a valid location of mining ground.

The words "dated on the ground" are mere surplusage in the location notice.

It is not necessary to state in the location notice the size, character nor position of the boundary monuments.

It is only the recorded notice of location which should contain a reference to a natural object or permanent monument.

Unless required by local rule or the custom of miners a valid location can be made without either posting or recording a notice of location.

Unless regulated by local rule or custom a location notice can be recorded before it is posted. Generally, the order in which those acts are performed is immaterial.

Recording a notice of location is not required by the Federal Statute and when not required by local laws is unnecessary and useless if made.

The Miner and the Court.

Strictly speaking, the term "tunnel" is only applicable to a nearly horizontal passage through a hill, open at both ends, as a railroad tunnel. But in this country the word tunnel is used in place of the word "adit," and is generally understood to mean a nearly horizontal passage from the surface, by means of which a mining claim may be entered, worked or unwatered. In the case of Jurgenson vs. Diller, the Supreme Court of this State has astonished the mining world by stating that "Drifting in a tunnel means taking earth, gravel or ore from ground made accessible by means of the tunnel, and is not synonymous with *running* a tunnel," and therefore not the kind of construction requiring a notice to be posted by the owner disclaiming responsibility under the Mechanics' Lien law.

The distinction is not apparent. How a tunnel can be "run" without taking earth, gravel or ore from ground made accessible by means of the tunnel the Supreme Court forgot to tell us. It would naturally seem that "drifting in a tunnel" or "running a tunnel" was a mere choice of words; but under the decision cited it would seem that a right of lien exists in the miner working upon a crosscut tunnel until it reaches the ledge, and at no time upon a tunnel which follows the vein. Carried to its logical conclusion, it seems to follow that a miner's right of lien under this definition will depend on whether he is working on pay ore or is engaged in prospecting or dead work. If he is seeking ore today, he may have his lien; but if he is stoping ore to-morrow, no right of lien attaches. The Supreme Court seems to have reduced the lien law to an absurdity, so far as the mine is concerned, by this opinion and the one which declared that no lien existed where the property worked was upon ground held under an agricultural patent or Mexican grant, as such land is not a "mining claim," although the work in one instance at least was shown to have been done on a "bed of auriferous gravel."

Concentrates.

THE Champion mine at Nevada City is employing 200 men.

AN expedition fitted out to search for gold in Terra del Fuego has left New York.

THE Canadian Pacific Railway is taking out about 1200 tons of ore monthly from the Slocan.

HOISTING WORKS are soon to be erected at the Pocohontas mine at Drytown, Amador county.

THE yield of gold from New Zealand for the three months ending September 30th was 237,079 ounces.

LEADVILLE shipped more ore in '95 than any other camp in Colorado—453,633 tons—mostly low grade, lead-silver and silver-iron ore.

THE Union Hill Mining Company has decided to erect a mill of large capacity on the group of mines in the Black Hills, South Dakota.

THE owners of the Louisiana mine, A. C. Cable superintendent, at Coulterville, Mariposa county, are about to erect a 10-stamp mill.

THE October tonnage handled by the Mercur, Utah, railway is reported larger than at any period since the rush to that camp last spring.

UPON striking rich ore in the Golden Queen mine in Butte county, which was purchased lately, H. P. Stow raised the wages of his men.

FIRE, last Friday, destroyed the hoisting works of the Gray Eagle mine, near Colfax, Cal. The mine is now worked through a tunnel.

THE striking Leadville, Col., miners have started a paper—the *Miner*. Many a paper has supported a cause, but no cause ever yet supported a paper.

SOME Salt Lake capitalists have been investing in claims in the Meadow Lake district in Nevada county, and claim that there are prospects of large mines there.

IT is stated that President Cleveland is a shareholder in the Golden Scepter Mining Co., at Quigley, Montana, which owns a plant that has cost about $750,000.

IT is reported that the old Sheep Ranch mine in Calaveras county will be started up again. It was many years ago one of the big bullion producers of the mother lode.

A DIAMOND DRILL run in 140 feet in the Alma mine, in Amador county, showed such good prospects last week that orders were issued to resume sinking, which will be continued to a depth of 1000 feet.

A LATE visit of Northern Pacific officials to Trail, British Columbia, is said to have been for the purpose of looking over the field with a view to building in a branch which would give two roads to the district.

THE Postmaster-General has issued a fraud order against James C. Lovett, treasurer of the Tortillita Gold Mining Company, having headquarters at 531 Broadway, New York City. The concern advertised mines in this State.

THERE are shipped 600 tons of concentrates monthly from the mines in the vicinity of Baker City, Or. This does not represent the entire value of all the ore in the district, as a large amount is saved on the plates in the stamp mills.

SAMUEL FRANKLIN EMMONS, of the United States Geological Survey, has been sent to the Black Hills to make a preliminary investigation for the purpose of determining whether or not a complete survey and report are practical and advisable.

SPECIE imports to San Francisco from January 1st to October 1st, '96, aggregate $4,283,209. Of this amount there was gold bullion, $665,912; gold coin, $2,136,150; silver bullion, $1,211,366; silver coin, $269,775. The totals for the first nine months of '95 aggregated $2,691,030.

THE annual assessment work required for two or more adjoining claims or group of claims can be done on one claim, the total amount of such work equaling $100 for each claim, when it can be shown that the work so done was for the development of all the claims in question.

DR. GEORGE F. BECKER, of the United States Geological Survey, has returned to Washington from his work of examination into the geology of the Transvaal. According to a dispatch from Washington he states that there is more gold in the Transvaal ready to be mined than the amount now in use throughout the world.

SUPERINTENDENT W. L. HONNALD of the California Exploration Company advertises in the Calaveras papers that a contract for driving and timbering 250 feet of tunnel on the Vair or Gobie ranch, near Mokelumne Hill, with the privilege of an additional 250 feet, will be let at the company's office, Mokelumne Hill, October 30, 1896.

PROBABLY the most striking illustration of the tremendous and universal interest now manifested in the great political struggle that culminates in the next ten days is furnished by the fact that one day's registration of votes in the city of Chicago aggregated almost 250,000 names. The total vote of this country on Nov. 3rd will be unusually large.

THERE will be an extra ten thousand issued of next week's paper. That is, in addition to the usual edition 10,000 more copies of the issue of October 31st will be printed and distributed. The issues of November 7th and November 14th will be devoted chiefly to the annual convention of the California Miners' Association. Of these, also, there will be a large extra edition.

THERE was transferred recently to the Boston and Alaska Gold Mining Company the title to forty-one mining claims on Admiralty island, Alaska. The property transferred includes a 10-stamp mill in operation. The Boston company has 50,000 shares of stock, some of which have been sold at $3 per share, and an issue of $400,000 6 per cent ten-year bonds, of which about $200,000 have already been placed.

D. K. ALLEN has sold for $60,000, to George W. Ireland, the Golden Dream group of five mines, the Alcyon group of five mines, the Oro Blanco group of five mines, the Noon Day group of five mines and four millsites, situated in White Gold basin, in the old Picacho district, on the Colorado river, in San Diego county. The veins are noted for their great size. They are of low grade, but have the advantage of being near the Colorado river.

THE Toronto *Star* urges that the Dominion Government should appoint a commission to proceed at once to British Columbia to investigate and report upon mining. "This should be done at once, or we shall have such a mining boom as will damn our mining interests for half a century to come. This is no idle talk, but a solemn warning, based upon observation and knowledge. The commission might consist of a mining expert, to examine mines and prospects, a judge or Queen's counsel, to examine the bona fides of the schemes projected, and a representative of the Government, to inquire into the sentiments of genuine miners, and to get himself in touch with the West with a view to subsequent legislation."

THE gold imports for September, '96, aggregated $31,359,130, as against $749,459 for September, '95; for nine months, $64,888,856, against $28,839,939 during the same period of '95. The exports of silver during September last amounted to $5,534,110, which is practically the same amount as was exported during September, '95. The exports for nine months were $94,641,041, and for the corresponding months last year $38,664,610. The imports of silver during September amounted to $741,406, and for September, '95, $1,751,193.

THE world's gold yield for '95 is estimated as follows: United States, $46,800,000; South Africa, $43,000,000; Australia, $42,800,000; Russia, $34,000,000; other countries, $36,400,000. Total, $203,000,000. It is thought that for '96 this country will produce $50,000,000, and that the other countries will show a proportional increase. The world's production of silver in '95 was $226,000,000 (coining value), divided as follows: United States, $72,000,000; Mexico, $64,500,000; Bolivia, $27,000,000; Australia, $26,000,000; other countries, $36,500,000.

SPECULATING on where the output of Cripple Greek of $1,000,000 for September went, the Denver *Republican* says: "There are now working in the camp fully 5000 men, who are exclusively connected with the mining industry, either as miners, engineers, surface men, ore haulers or mill men. These draw in the aggregate fully $350,000 a month. The railroads and mills get for hauling and treating the ore $160,000 more, the timber, fuel and ammunition expense will reach $120,000, and this leaves for the profit of the mine owners $370,000."

A CHICAGO syndicate has purchased for $200,000 the claims and property owned by the Alaska-Willoughby Gold Mining Company and the Mountain King group in Alaska. It is stated that the size of the mill will at once be increased to thirty stamps, as was originally intended, and that a narrow-gauge railroad will be built from the beach to the King group. This group consists of eleven claims—the Mountain King, Mountain Queen, Devil Club, Alice Miller, Pungle Up, Pungle Down, Columbia, Washington, Cleveland, Pyrate and Patterson.

AT the rock drilling contest at the Spokane fair Freethey and Davey of Butte, Montana, held their title to the championship by raising their own record from 42 inches to 49⅜ inches. It was an exciting affair, for good work was done by all the contestants. O'Donald and Spaulding of Cœur d'Alene began by driving the drill down 40⅝ inches. Freethey and Davey followed, making a record of 49⅜ inches. After the Butte team had finished Ross and Smith, the Rossland team, drove the drill into the rock 44 inches, breaking the previous world's record 2 inches.

THE manager of the De La Mar properties in southern Nevada, H. A. Cohen, speaking of them, says that the group known as the De La Mar Company has an output of between $195,000 and $200,000 per month. The capacity is 200 tons a day and the monthly average during this year has been 6500 tons. Notwithstanding the fact that the camp is 170 miles from the railroad, men are going in by the hundreds. All imagine they are going to get work, and a probable explanation of the fame of the camp is that the mines are dry, pleasant to work in, and the men, without exception, receive $3 per day.

THERE have been recently a number of representatives of big European syndicates and capitalists in Utah and southern Nevada seeking to purchase some of the big producing mines. Among those which have been or are now being considered are the Mercur, Sacramento, Centennial Eureka, Silver King, DeLamar and April Fool. So far, it is understood, the figures offered are not acceptable to the owners. The Mercur, which has paid half a million in dividends, was some time ago offered in London, but lately the offer was withdrawn, although the English people were ready to pay the price asked.

AT last Tuesday's meeting of the State Anti-Debris Association Manager Phipps stated that many complaints had been made of the injurious effects produced by mining in the river beds near Oroville, by which the material in the river was excavated, removed by elevators and placed again in the river, and reported on the cases pending in the Federal and State courts. It is expected that Judge McKenna of the United States Circuit Court will soon render his decision in the North Bloomfield case, involving the construction of the act of Congress prohibiting hydraulic mining where permits have not been obtained.

A CORRESPONDENT of the Seattle *Spokesman-Review*, writing from Trail, B. C., says: "To a visitor who walks the streets for the first time, the sight of so many well-built stores and homes, the numerous improvements, the huge smelter pouring out smoke and steam from a dozen stacks, the two bridges built by the town, costing $6000, and the clatter of carpenters' hammers, the whiz and whir of the steam hoist, as it draws the loads from the decks of the river steamers, the machine shops that are now in full operation, saw mills, a brewery turning out fifty barrels of beer daily, bottling works, street grading and the Columbia & Western Railway, as it rushes through the town dragging heavily loaded cars from the steamboat landing to the interior, returning with ore cars to the mines—all impress one that the town has been in existence many years, when the fact of the matter is that it has not seen its first birthday, and will not for a month to come."

A MINER lately returned from Circle City gives some information about that place that will interest miners used to the customs of earlier days in this State. He says in the Seattle *Spokesman-Review*: "I passed women on the trail on the way to Circle City. The city is a log cabin town of about 1300 people, when the miners are all at home. There are about fifty women in the place. It is governed by miners' law, and there is no appeal from its decisions. No one is allowed to carry a revolver. Any infraction means a trip down the Yukon with only blankets. All respect the law set down by the miners. There is no theft. I never locked my cabin door. One man did steal some dust and the culprit had to leave. George W. Ross is deputy collector, and H. H. Wendling, both Eastsiders, is with him. The miners don't like the impression to go abroad that they are not law-abiding, although they are a law unto themselves. Circle City is an orderly mining camp. Of course, there are twenty-six saloons in the place, and dancing halls, but, on the whole, it is an orderly mining town. The recent killing of a man took place before I left, and I was a witness to it. The man who did the shooting was tried and acquitted by the miners' court."

IN a lecture delivered by Professor Robert Lewers on the history of Nevada, he states that the first permanent settlement within the present limits of Nevada was made at Mormon station by John Reese, a Salt Lake trader, on July 4, 1851. Gold canyon was well known to the overland travelers, and it is probable that gold was discovered in what is now known as Dayton in 1849. It is certain that Cole and Robison discovered it there in 1850. Sol Weill, a contractor on the Reese or Rose ditch, now known as the Douglas ditch, brought about thirty Chinamen from California to work on the ditch, and renamed the settlement Chinatown. Chinatown changed and Mineral Rapids appeared, then Clinton, then Nevada City, and finally in 1861 the citizens in public meeting selected the name of Dayton. Virginia City was settled in 1859, and Lyman Jones, now of Silver City, built the first house.

IN calling for a meeting to reorganize the El Dorado County Miners' Association, J. F. Lang writes to the Placerville *Nugget*: "The revival of the mining industries of El Dorado county is steadily improving and the outlook is quite encouraging. After long and persevering work in seeking to represent the situation carefully and honestly, we are attracting attention of capitalists toward this section of country. Along with the growth of this search for mining properties, we are establishing the fact in the minds of mine seekers that El Dorado, though it has been dormant for many years, is a good and safe country for the prospector, that the mines are here and can be found, but that we require the aid of capital for their development. In keeping with this spirit of progress, we should be in accord with the State Miners' Association, whose benefits and advantages to California were well outlined in the article presented in the *Nugget* yesterday from the MINING AND SCIENTIFIC PRESS."

THE present methods of mining iron ores vary according to the character of the deposit, from stripping and mining with the steam shovels to working with rock drills many hundreds of feet below the surface of the earth. Some mines are wrought open cut, but the majority are operated under ground; all the different methods of long-wall mining, caving, milling, overhand and underhand stoping, as well as the various systems of timbering and filling, are said to be in active use in the iron ore mines of Lake Superior. The character of the ore also varies from soft material, easily handled by the shovels, to rock so hard as to severely test the tools and apparatus employed. As showing the difference in this respect characterizing different localities, it is stated that rock drills of the same size and working under similar pressure, which bored 100 to 120 feet in ten hours in the limestone of the Chicago drainage canal, could not cut more than 5 to 6 feet in hard Minnesota and 18 to 20 feet in hard Marquette ores.

PRODUCTION from the Cripple Creek, Col., district was heavier in September than in any other month in the life of the camp, exceeding by fully 1200 tons the output of October, 1895, which held the tonnage record up to then, says the Denver *Republican*. Cripple Creek is not a heavy tonnage camp, but what it fails in quantity it makes up in quality of the ore. A close estimate of the September output makes it 16,500 tons. The nearest estimate of the aggregate value of this ore obtainable places it between $900,000 and $1,100,000. October will undoubtedly show a substantial gain over these figures. For the year estimates are difficult to obtain. During the first six months the output suffered from the loss of the Portland and Independence, and there were few new mines to offset them. The general opinion is that it ran between $4,000,000 and $5,000,000 in that period. Since then the output has been heavily increased by many small new mines and by the heavy production from the Gold Coin, Anaconda, Ironclad and Gold Crater companies, as well as the increase from the Victor, Elkton, Anchori-Leland and Moon-Anchor. Close observers say that the total production for the year will reach $10,000,000, an increase of $2,000,000 over last year.

THE annual report of Commissioner Lamoreaux for the fiscal year shows land selections for the year aggregating 13,209,000 acres, of which 6,789,591 acres were railroad selections. The acreage increase over the previous year was 4,802,673 and the cash increase $72,709, the total cash receipts amounting to $2,106,361. The railroads received patents to lands on grants covering 15,527,844 acres, being an excess of 7,343,508 over last year. Agricultural patents increased 2,684,380 acres, the total being 5,570,400 acres. The total number of acres for which patents were issued was 22,669,989. The surveyed vacant public land is 316,651,861 acres, the unsurveyed 283,388,810 acres, a total of 600,040,671 acres yet unoccupied. Of the surveyed acreage 8,908,808 acres were added during the year. Recommendations are offered by Commissioner Lamoreaux for the good of the department as follows: For the continuous appropriations for surveys and resurveys of public lands; for the creation of the office of surveyor general of Alaska; for the establishment of a national irrigation commission; providing for the compulsory attendance of witnesses in contests before district land offices; for the protection of timber on the public domain and on public forest reservations, and timber from destruction by fire.

W. F. KENDRICK of Denver writes: "Letters received indicate that the opinion prevails among many people that the depression in mining stocks, which was in sympathy with other lines of stocks during the hot weather, was on account of lack of production of the mines of the State; but this is a serious mistake. As an illustration: Although many mines of Leadville were closed by the labor troubles, which affected that camp only, it is producing now probably over 1000 tons of ore daily, and from the additional mines resuming work we anticipate 1500 tons daily by the first of November. At Cripple Creek the output for September is given to exceed 17,000 tons of an estimated value of $960,000, and for the balance of the year the output will considerably exceed $1,000,000 monthly, as there has been a greater amount of ore blocked out ready for shipment, and more new strikes within the past sixty days, than in any other period in the camp's history. Gilpin, Clear Creek, Boulder, Alma, San Juan, Gunnison and Aspen districts are exceeding their last year's output, and in each and all of these camps an unusual amount of preparatory work is going on for active winter mining. The improved methods and system by which mining is now conducted over former years increases not only the product of the mines, but the net profits in a greater ratio. The new mills and reduction works erected at or near the mines this season, so far as we are acquainted, have a capacity for handling about 600 tons of ore daily additional to that of the past."

The Development of Colorado's Mining Industry.

By T. A. RICKARD, State Geologist of Colorado.

The history of Colorado is that of one generation. Thirty-six years only have elapsed since the birth of that beneficent industry, whose footsteps were the first to traverse the wilderness of the prairies and penetrate the solitude of the mountains. So soon is history made.

In the summer of 1849 a party of seven Georgians were taking a herd of thoroughbred horses across the continent to California. They reached Camp Lyon on the Arkansas in October, and, meeting James Dempsey, a Government guide, they were persuaded by him that it was too late to cross the mountains that season. His advice was followed, and, moving northward, they established a winter camp at the junction of Cherry creek and the Platte. Upon a sand-bar lining the south side of the river, they built two cabins. During the closing months of that year they prospected the alluvial banks of Cherry creek, but did not penetrate into the mountain canyons for fear of the Indians. Gold was found in several places, and particularly at a point sixteen miles up the stream. From the feathers of the wild geese which they shot they made quills, serving as receptacles for small quantities of gold dust.

This party consisted of Dr. Russell and his brother, Green Russell, A. T. Lloyd, G. W. Kiker, Chas. Kiker and P. H. Clark. Early in 1850 they crossed the range by the Bridger pass and went on to California. In the spring of 1857 they, with others, sold out their interests in California and returned to Georgia. Before separating, it was agreed among several of them that in the near future they would form a prospecting party to go to western Kansas and search for gold.

In May, 1858, eleven of them met at the Planters House in St. Louis. In addition to the original seven there were present J. A. O'Farrell, three men of the name of Chastine and another called Fields. All save two were old Californians. Late in June they left Camp Harney, accompanied by an escort of twenty men under the command of Captain Lyon. In August the party reached the log cabins on the Platte and went to the places where Russell and his friends had found gold in 1849. Sufficient was found to encourage them. Prospecting parties were then organized. It was too near winter to begin serious mining. They returned to camp. Six of the party went East to procure provisions, returning in the spring of the following year—1859.

This was the year of golden discovery. By the close of 1858 rumors of rich diggings had crossed the plains, the rush had set in and crowds began to arrive. Among these came John Hamilton Gregory, who, with J. M. Cotton and his brother William Cotton, went up Clear creek and discovered the outcrop of the Gregory lode on the 6th of May, 1859. This date is the birthday of Colorado's mining industry.

The discovery of the Gregory lode was immediately followed by that of other veins, whose production in the succeeding years made Gilpin county the leading gold mining district of the Rocky mountains.

In the meantime bands of prospectors had scattered all over the neighboring hills and were finding the gold depositories whose later developments made the counties of Clear Creek, Boulder, Gilpin, Summit, Park and Lake one great mining region. * *

In 1874 W. H. Stevens and A. B. Wood came over the range from Fairplay, where they were mining, to build the Oro ditch. When examining California gulch, Wood found float consisting of carbonate of lead ore and began digging on the south side, now known as Dome hill, on what was afterward the Rock claim. He sank a little shaft through the drift which covered the outcrop at a point subsequently worked by an open cut. He found ore in place, but low grade. This was in the fall of 1875. He made arrangements to have some work done that winter, and this led to the uncovering of the outcrop across California gulch up Iron Hill. The next year the whole line of outcrop claims was located on the supposed vein. In 1878, also, George Fryer sunk a hole on a hill north of Stray Horse gulch and found carbonate ore, uncovering in this act the great ore measure which, as "the first contact," proved one of the most remarkable bodies known in mining geology. A month later Rische and Hook happened to sink a hole where the contact approached the surface and found the ore body which subsequently became the Little Pittsburg mine and the foundation of Tabor's fortunes. Other discoveries followed fast. That year (1878) Leadville's output exceeded in value three millions. In 1887 it culminated in an output estimated to be worth $13,500,000. Up to date its yield has been $215,000,000.

In the meantime other mining camps were being born. In the fall of 1872 veins were found near Rosita in Custer county, and in 1877 the Bassick began to produce, creating the excitement of Silver Cliff. * *

During this period the mining industry of Colorado was going through the troubles of its early youth. The history of Gilpin county is so typical of this phase of its development that I have reserved it for special description.

Following upon Gregory's discovery, other veins, subsequently famous, were found. On the 15th of May the Bates' lode was uncovered, on the 25th the Gunnell, Kansas and Burroughs. The Bobtail was discovered in June. The early mining operations consisted of the removal of the soft decomposed croppings, which were washed in sluices, after the fashion of ordinary placer mining. The harder outcrops were crushed under trip-hammers until arrastras were introduced, to give way in their turn to primitive stamp mills. By the first of July, 1860, there were sixty mills in operation. Everything proceeded serenely. But the gossan gave way to pyritic ore as the discovery shafts penetrated deeper and the saving of the gold became more difficult. In spite of these drawbacks, the richness of the upper portions of the first found lodes was such as to leave a handsome margin and maintain a steadily growing population. In the winter of 1863 and the spring of 1864 several mines were sold in New York and Boston. A stock mania supervened, only to collapse suddenly in April. At this time, also, came the period of incoherent processes with the promise of 100 per cent extraction. Some of their progeny still survived, uttering claims nearly as magnificent. The inexperienced chemist, with his revelation for cheap ore reduction, continued what the stock jobber had begun. The mining industry of Gilpin was crippled unto death.

At this time the easily amalgamated surface ores had in many instances become exhausted, giving place to hard pyritic material which refused to yield up its contained gold. Extraction in the stamp mills continued to become worse. Many mines were compelled to close down, others were operated at a ruinous loss of the gold in their ores. A depression fell upon the district, which was not removed until 1868, when a general revival began. The leasing of claims by working miners led to new discoveries, and the consolidation of adjoining territory diminished expenses. At this time the smelter came to the rescue of the baffled mill man. * * * *

This represents a stage of progress common to all our mining regions. Crude milling methods gave way to fire reduction processes and the latter, by their heavy charges, invite the millman to improve on his cheaper methods, so that competition is restored. The smelters saved the mining industry of Gilpin county when it was on the verge of utter collapse. And on the restoration of prosperity the owners of the stamp mills were enabled to carry on experiments where expense was met by the sale of ore to the smelter, so enabling them to evolve a method of stamp milling which was well adapted to the treatment of the heavy pyritic ores produced by their mines. In 1871 the problem had been solved, and to-day 500 stamps do excellent work with the low-grade ore of the district.

Gilpin county has produced about $68,000,000 to date.

While these problems were undergoing solution mining was winning fresh territory southward amid that great complex of mountains whose waters drain into the San Juan river. * * * In the spring of 1871 lode mining may be said to have commenced by the discovery and location of the Little Giant vein, just above the present town of Silverton, by Miles T. Johnson. In the following year an arrastra was built and the gold thus extracted out of the ore was taken for sale to Conejos, the nearest trading station. In 1874 was commenced the erection of a smelter, the machinery of which came on burroback from Colorado Springs, where the Denver & Rio Grande Railroad had just reached. The ore supply of this smelter came principally from the Aspen, which at that time was the chief mine in the locality. * * *

In the meanwhile Gus Begole had crossed the western range from Silverton and, descending into the valley of the Dolores, located claims which later became the Yellow Jacket and Aztec mines. But the ore was too low in grade and work soon ceased. In 1878 John Glasgow and "Sandy" Campbell came northward from La Plata City and began the successful development of the Grand View and Atlantic Cable, causing the growth of the town of Rico. The news was spread abroad that another Leadville had been found, and crowds trooped in across the hills during the summer of 1879. In the fall of 1880 the smelter began operations. Nevertheless, the district would have gained but slight distinction had not the ore deposits of Newman hill been found. These began to be productive when, on the 6th of October, 1887, David Swickheimer struck the big ore body of the Enterprise mine.

In June, 1870, gold was found in Wightman's gulch. This led to the location of the Little Annie in September, 1873, and the opening up of the Summitville district, which is tributary to Del Norte, whose position made it a natural gateway to the watershed of the Rio Grande.

And so we come to recent times, no less stirring than the old. The history of the last decade centers round the discovery of Aspen, the stories of Creede and of Cripple Creek, the collapse of silver mining and the development of new gold fields.

N. C. Creede found the float of the Holy Moses vein, on West Willow creek, a tributary of the Rio Grande, in 1890. As a consequence, the King Solomon district, as it was then called, began to attract the prospectors scattered in the mountains above Del Norte. No important results ensued until in June, 1891. D. H. Moffat and Capt. L. E. Campbell came to Wagon Wheel Gap to visit the Holy Moses, on which Mr. Moffat had secured an option. Creede was engaged to prospect for them. Shortly afterward, Theodore Reiniger made a discovery on Bachelor Mountain, and located it as the Last Chance claim. He did not realize its value, but Creede, who happened along, saw an outcrop which marked the hanging wall of a vein whose debris was scattered around. At a depth of 2 feet he found very good ore and on the 8th of August he located the Amethyst claim. A very little work proved up a magnificent vein and as a consequence the camp sprang into tremendous activity culminating in the boom of 1892. The immediate extension of the railway from Wagon Wheel Gap stimulated a production which reached its maximum in an output of $3,100,000. Then in the summer of 1893 came the sudden fall in silver and a collapse from which Creede has not yet recovered.

Creede and Cripple Creek were rivals in attracting attention during 1891. Both have had strange vicissitudes. Our new gold field lies on the southern slope of Pike's Peak, whose snow-clad crest was the beckoning guide of the pioneers of 1853. Although no gold discoveries of any moment were made in the early days among the streams, or on the hills lying at the foot of the old Beacon Mountain, it nevertheless gave its name to the mining excitement of that period. This has, however, of late, justified the expectations of the tenderfeet of forty years ago.

The first recorded locations were made in February, 1891, but the clustering hills which are now dotted with productive mines had been disturbed by the miner's pick as early 1874. Silver ores were found in a shaft located close to the present Elkton mine. Ores rich in white metal have been found in late years, and the Moose made one shipment of thirty tons, carrying an average of seventy ounces of silver, in addition to the gold.

Ten years afterward, in April, 1884, the district was the scene of the queer fiasco which has gone into local history as the Mt. Pisgah excitement. A crowd of four thousand men were brought together on the rumored discovery of rich placer ground. Nothing was found save in the holes of the original locators. Man had endeavored to remedy nature's niggardliness and poor rock had been artificially enriched. Lynching was threatened, but in the failure to catch the perpetrators a big picnic took place, after which the hill slopes again became the quiet cattle ranges for which they seemed best adapted. Those deluded prospectors let slip a great opportunity. Mt. Pisgah's dark front now overshadows the busy streets of the town of Cripple Creek, and, on the ridges opposite, line after line of smoking chimneys bespeak a long succession of productive mines.

During the spring of 1891 Cripple Creek began to receive respectful mention in mining circles, but the discoveries made at Creede during that summer diverted attention from a district whose previous experience had given it an unsavory reputation. When, however, the silver market collapsed in June, 1893, and mining seem prostrated, the men of Aspen and Leadville turned with the energy of despair to the new gold field which previously had been poohpoohed, and the concentrated activities of the State were directed to the development of Cripple Creek. With a rare good fortune the new camp answered to the call, and, as explorations extended, there came a swift succession of rich discoveries which caused the output to spring from $583,000 in 1892 to $2,100,000 in 1893. This growth continued so that in 1894 the yield was $3,900,000, and in 1895 it reached $7,800,000. These figures are sufficiently eloquent of the development of a district which today is the largest producer of all the gold mining camps of the United States.

During the past three years discoveries in other parts of the State have received attention, and large claims have been made in behalf of several new districts. West Creek, Cottonwood, Hahn's Peak and the Gunnison region may be cited. Of these the last named is much the most important. At the headwaters of certain streams, tributary to the Gunnison river, there have been found veins which are now supplying several stamp mills with pay ore, and have given birth to the settlements of Vulcan, Spencer, Iris and Dubois.

While the new territory which has been won during later days adds its tribute of gold and silver to the old established mining centers, it must be noted that the latter have also accommodated themselves to new economic conditions. The Silverton district, in the southwest, for instance, which in 1892 yielded gold worth $155,624 and silver valued at $354,125, gave in 1894 gold amounting to $360,320 and silver worth $235,000. This is typical of the changed conditions regulating the industry. It is a striking evidence of that resourcefulness which has enabled the State to overcome difficulties. The collapse of silver mining led directly to an impetus in the search for

gold, and the variety of ores so puzzling in the infancy of our smelting industry is to-day its chief aid, because it enables the attainment of that admixture of material which is the essential of successful reduction.

Colorado has yielded to date gold valued at $137,475,000, and silver having a coinage value of nearly $400,000,000.

Thus from humble beginnings a great and complicated industry has been created. Its development may be summarized in four periods, the discoveries in Gilpin county and the adjoining camps in the granitic rocks of the Front range, the era of silver mining in the carboniferous limestones of Leadville, Aspen and Rico, the development of the fissure veins in the andesites of the San Juan, and, lastly, the revival of gold mining consequent upon the uncovering of a great series of ore deposits in the volcanic complex of the Pike's Peak region.

Mine and Mill Reports.

Following are convenient forms of weekly and monthly mine and mill reports that may be of use to some who wish to prepare concise and comprehensive reports of work done. They were prepared by and are published with permission of a prominent mine superintendent:

BLANK GROUP OF MINES.

MONTHLY REPORT.

June, 1896.

2606 tons of ore were crushed with assay value of $13 00.....$33,878 00

Mint returns from free gold caught on plates.	$ 9,682 90	
Gold bars in transit (estimated)	2,238 10	
291 tons concentrates at $55 00 per ton	16,005 00	
Lost in tailings	3,127 00	
Free gold caught in boxes, moisture, etc	2,825 00	
		$33,878 00

RECEIPTS.

Free gold saved on plates	$11,921 00	
291 tons concentrates at $55 00 per ton	16,005 00	
		$27,926 00

EXPENDITURES.

Mining and Development.

Labor	$6,346 25	
Powder, fuse and caps	275 60	
Candles, nails, tools, etc	250 46	
Lumber and charcoal	137 50	
Oil	22 72	
Stulls and lagging	270 00	
Feed mine mules	25 00	
Team, 20 days (hauling lumber)	30 00	
Office and superintendence	175 00	
		$ 7,526 53

Milling and Reduction.

Labor	$1,248 00	
Supplies, sundries	48 48	
" oil	25 00	
" quicksilver	25 00	
" screens	47 52	
" wood	345 00	
" charcoal	16 20	
Wear Shoes, Dies, etc., 10 cents per ton	260 00	
Mint charges	65 00	
Postage on bullion	16 52	
Chlorinating 291 tons contrates at $5 per ton (estimated)	1,455 00	
Loss 5% value of concentrates (estimated)	800 00	
Hauling ore, 40 cents per ton	1,042 00	
Office and superintendence	175 00	
		$ 5,569 32
Net profit	14,830 15	$27,926 00
Profit of the boarding house	$ 354 14	
Total profit for the month	15,184 29	

CHLORINATION DEPARTMENT.

There were treated 352 tons roasted ore at $57 94 per ton		$20,394 88
Mint returns from chlorination gold	$10,934 35	
Chlorination gold in transit (estimated)	8,460 76	
Lost in tailings	806 70	
Unaccounted for to balance	193 07	
		$20,394 88

Percentage of recovery, 95%.

REPORT FOR THE WEEK ENDING.....1896.

.....1896.

TO THE DIRECTORS:

Mine:

There were employed in and around the mine an average force of.....men, at a daily cost of $.....; .....of these were employed on development work, and the remainder on the extraction of ore and permanent improvements.

STATEMENT OF PROGRESS—DEVELOPMENT WORK.

No. 2 east, - - - - - total length....ft.; weekly progress....ft.
No. 2 tunnel, east drift, - total length....ft.; weekly progress....ft.
South crosscut, - - - total length....ft.; weekly progress....ft.
West drift, bottom of shaft, total length....ft.; weekly progress....ft.
East drift, bottom of shaft, total length....ft.; weekly progress....ft.

The faces of both drifts in the shaft are looking well, there being about.....inches of ore in each face. The face of No. 2 east also shows about.....inches of ore.

Reduction Plant:

There were employed in and around the plant an average force of.....men; .....of these were employed at the regular operations of the mill, and.....in the permanent improvement of the plant.

Stamp Mill:

Following is the result of the stamp mill operations for the week ending at 7 o'clock A. M. of.....

There were crushed 570 tons of ore at $9 90 per ton		$5,643 00
Free gold saved on plates (estimated)	$2,875 00	
44¼ tons of concentrates at $50 00 per ton	2,212 50	
Lost in tailings	473 00	
Not accounted for to balance	82 50	
		$5,643 00

Of the $2,212 50 gross value of concentrates 95% or $2,102 00 will be saved in the chlorination, which will make the total recovery of gold for the week amount to $4,977 00.

Chlorination Department:

There were treated 66¾ tons of roasted ore at $71 00		$4,739 25
Lost in tailings $4 20 per ton		280 35
Total recovery		$4,458 90

Percentage of recovery, 94%.

Respectfully,

.....Superintendent.

Gold Mining Coming to the Front.

Written for the MINING AND SCIENTIFIC PRESS by DAN DE QUILLE.

The world appears to be entering upon a mining era. The increased activity in the industry of mining the precious metals, which has been observable among men of capital in the Western world, is quite marked and operations in the shares of mining corporations have become a leading feature of the exchanges of the principal financial centers of Europe. Even the slow-moving peoples of the Orient are awakening to the importance of gold and silver mining. In China, Japan, Korea and other oriental countries steps are being taken looking to the development of their resources in the way of precious metals. In India the ancient gold mines are being reopened and worked and prospectors are now pushing their way into the little-known mountain regions bordering upon Thibet. Men of capital and mining experts are already going into Siberia, where the rich alluvial gold fields along the Amoor river have long been profitably worked, in anticipation of the completion of the great Russian railroad through that country, when the gold and silver veins in the elevated regions above the placers and on the rocky steppes of Mongolia may be exploited.

The English, however, are at present more active in the industry of mining for the precious metals than the people of any other nation in the world. There is a reason for this. The fact is that there now exists great business stagnation throughout all parts of Great Britain. The complaint of dull times is universal and extends to all her leading home industries—agriculture, manufactures, trade, commerce, all are depressed to an unprecedented degree. Even her coal and iron interests are suffering severely and have been going down for eight or ten years. Finding their lands and shops and many of their other home industries affording them scanty profits, they have seen the necessity of looking out for some kind of business that would yield them some return for money invested.

In every hemisphere and under every zone English companies are now to be found opening up and working mines, the English expert being there also, searching after others wherever paying deposits have been encountered. Such has been the success of the English in mining ventures in Australia, South Africa, India and America, that the majority of the rich and well-to-do people in England are now more or less interested in mining, London being the grand center of operations in the mining enterprises of nearly every country on the face of the earth. No matter where the mines dealt in are situated, it is in London that the chief office is located and there most of the directors reside. Also to London comes the bullion from the gold and silver mines and thither all reports are sent.

The English own many excellent paying properties in California and other Pacific coast States and they are constantly adding to the number of their holdings. In the future, as things are now going in the business world, English purchasers are likely to be more numerous than ever before in the Pacific coast region. The troubles in South Africa and the almost insurmountable obstacles to mining in West Australia will turn many among them in this direction. If there is salvation for failing England, it lies manifestly in the industry of gold mining. In this business the growing manufactures of other countries will not much affect her, as she will have nothing to fear from over-production or competition. In mining her people may continue to enrich themselves, even while other sources of their prosperity and power are being dried up. That a people so sagacious will not be long in discovering this fact, nor slow in availing themselves of these outlying opportunities to recuperate their waning strength, may well be believed.

As at present conducted, the risks to be met and faced in mining are not so great as in many others of the leading industries which engage the attention and command the capital of men of business. In commerce the chances taken in sending forth ships to face the storms and perils of every sea are greater than any to be met with in the working of a mine. In dealing in railroad shares and in operating in wheat, oil and other products in the leading markets of the country in accordance with the present methods, there is far more danger of loss and sudden ruin than is possible in working a mining property. Indeed, mining is even safer as a business than farming—the oldest of all the industries, and that in which greater numbers of the people of all nations are engaged than any other—for the farmer is in danger of loss from the time his seed is put into the ground—loss from drouth, insect pests, hail and other storms, frost and the like—and then, when a good crop has been secured, the chances are that prices will be so slow that there will be no profit on the products of the farm when marketed.

In America the capitalists of the great financial centers do not give that support to the mining industry which is accorded it in London, Paris, Berlin and other cities and towns across the water in the Old World. Here the attention of the moneyed men of the big cities appears to be principally devoted to mining the pay streaks in the products of farm and plantation and in driving for bonanzas in Government bonds. However, there is observable a growing interest of late in mining, particularly in gold-producing sections. Many persons are purchasing mines in the great gold field and are using large amounts of capital in the development of country. These men come from no particular center, but from the country at large. As gold mining is about the only industry in which capital can now be invested with any hope of profit, the number of Eastern investors in gold properties is likely to rapidly increase. The fact that many Eastern people own, control or have large interests in some of the best paying mines on the coast will no doubt encourage others who have idle money to come west and assist in the development of our immense gold field.

This gold field extends from the north line of Mexico to the northern limits of Alaska on the Arctic ocean in length, and in width from the eastern base of the Rocky mountains to the Pacific ocean. Every foot of this region is not auriferous, but it comes as near being so as does the territory of any other gold-producing country. It is a region of great and unknown possibilities. In it is room enough for all who may elect to come.

One coming to our mines has choice of a wide range of climate, scenery and soil. He may settle in one of the valleys of the mountain region lying between the Rockies and Sierras, may make his home beside an Alaska glacier or pitch his tent among the orchard and flower gardens of California. Everywhere there is an abundance of room; even in California, the oldest of the mining States, there are vast areas that lie as untouched and unknown as in the "days of '49."

A Miners' Association Headquarters.

A correspondent writes as follows to us in reference to Secretary Sonntag's communication as to what the Miners' Association has accomplished and its needs, which we published September 12th:

I have read with much interest the article in your paper on the value of the Miners' Association to the public and I am fully in accord with the suggestions therein expressed. Its services to the mining interests of the State are not properly appreciated by the public generally, and especially by many of the outlying counties which have been backward in contributions to its support. Its members have given their time, energies and money to the objects of the Association with unselfish zeal that deserves the recognition and highest praise of the public and of every miner in the State. Its efforts in the cause of mining interests have done much already to improve the condition of the miner, but there is a great deal more to do: to eliminate the unjust decisions and rulings of the departments at Washington against him, arising in a great measure from ignorance of the questions coming before them.

The demand for the appointment of a Mining Secretary in the Cabinet is one that should meet with the approval of every mining man on the coast, and should be made the subject of an appeal to the next Congress by a petition circulated and signed by the people of this State, as well as by the adjoining States and Territories. Let such a petition be started in every town and mining district in the interior. No doubt the editors of all the newspapers would aid in the cause, by opening such papers for signature at their offices.

I cannot quite agree with Secretary Sonntag of the Association as to the policy of opening a Bureau of Information, connected with the office of the Association under its present limited means, for to equip such a bureau and maintain it would cost no small amount of money. Again, what is the present Mining Bureau for except to supply information to the mining community and the public, which it is eminently fitted to do by reason of its facilities in the way of an extensive library and statistics gathered by experienced experts at an expense that would be ruinous to the Association, to say nothing of the cost of such a library as the Mining Bureau possesses, which it has taken years to collect and has cost many thousands of dollars. No one man could be found whose head would contain all the information required by the thousands that visit the Mining Bureau.

The most feasible plan and one that would cover the ground would be to move the Mining Bureau to a more central location down town, in connection with or adjoining the rooms of the Association, where easy access to all required information could be obtained at no expense to the Association. The present location of the Mining Bureau is very objectionable and unfitted for the convenience of the public and should be moved to a more central point anyhow, aside from the suggestions named. It has not been able to select a more convenient place for want of funds, as the appropriations have been too limited, and the most rigid economy has had to be practiced to enable it to carry out the objects of the Bureau in gathering the surprising amount of statistics and information it has been able to on such a limited appropriation. It is hoped the next Legislature will be more liberal in its appropriation to this valuable institution.

Note on a Shaft Fire and its Lesson.*

By ROBERT GILMAN BROWN, Bodie, Cal.

There are few disasters so difficult to deal with as an underground fire. It is inaccessible at best, and generally unapproachable; and it finds most material in the very places where it can do most harm, namely, in large stopes and in "heavy" ground where timbers are massed, and in shafts and level stations where there are inevitably strong drafts to make the burning yet more fierce.

The fire constituting the subject of this note occurred in the shaft of the Standard mine at Bodie, California, and originated after the departure of the night force at 3 A. M., being discovered by the men going to work at 6:30. At that time it had gained already considerable headway, and was throwing smoke plentifully from the collar of the shaft.

It must be premised, for understanding of the situation, that in this shaft all hoisting is done to the 320-foot level, where the material is dropped by chutes 30 feet to the tunnel level, through which it is run to the mill. Hoist and sheaves are all placed underground, the upper portion of the shaft being open, but unused. The tunnel is 1800 feet long, and attempts were made at once to reach the shaft through it, but increasing smoke and gas drove the men back a hundred feet and more.

The natural course in such a case is to bulkhead everything as tightly as possible, with the hope that the fire may be smothered in its own carbonic acid, but in this instance the element of uncertainty was too large. There was a nest of old timbers in ore chutes and shaft, above tunnel level, where fire would lurk for months; and, more than that, there were a dozen connections through caved stopes to neighboring mines that could not be bulkheaded as well as through openings that perhaps could. The shaft must, therefore, be approached at the ore chutes on the tunnel level, if possible; and this might be made possible by leaving the tunnel as the sole free intake. All other openings, to the surface direct and through other mines, were at once sealed, with the hoped-for result. In the course of two hours the chutes could be reached, and a hand-to-hand fight with the fire could be begun. In this struggle important aid was furnished, absurd as it may seem, by hand extinguishers, and the drug stores of the town were ransacked for bottles suitable to hold acid, while the assay office furnished the soda for numberless charges. At first water was brought in in barrels, and a hand force pump was used. Later, connections were made from the outside to the mine pipe which passed out of the tunnel, and water was pumped in, to be thrown upon the fire, through a 2-inch hose, by a small centrifugal pump driven by electricity. The latter arrangement was put into operation on the second day of the fire. By this time the chutes and shaft at tunnel level had caved down, and the fire in the half-buried timbers had to be fought for a day or two more, the fear being that it would work down the shaft.

Meanwhile water was being pumped from a neighboring mine through fire hose into the collar of the shaft, which, spattering and spraying down, finally saved the upper 200 feet of it.

The damage was ultimately found to extend upwards from tunnel level, where the cage had wedged, and to include the chutes and hoist station. This must be regarded, in view of the much greater disaster threatened, as a most fortunate and satisfactory result.

By way of deducing for general application the lessons taught by this experience, it may be well to classify the elements which combined to lessen the injury incurred under the two heads of existing conditions and active relief measures.

Existing Conditions.—These might well be called adventitious or accidental circumstances, since they can scarcely be said to have been provided deliberately with a view to the emergency in which they came into play. Apart from the conditions involved in the nature of the mine, the locality of the fire, etc., they comprise:

a. The wedging of the cage just above tunnel level.

b. The presence of a water pipe in the tunnel, with outside connections to adequate water supply.

c. The possession of a centrifugal pump and electric motor that could be put into operation almost immediately.

d. The supply of water from a neighboring mine, and sufficient hose to bring it to the collar of the shaft.

Relief Measures.—Under this head may be mentioned:

e. The bulkheading of all approaches save one.

f. Fighting the fire with hand extinguishers.

g. Hauling in water and using hand force pumps.

These two categories are not food for pleasant consideration, yet it is safe to say that the conditions of 80 per cent of the metal mines of the West are today no better.

It is clear that the first list, which really made the fight a winning one, deserves special consideration, with the view of converting its elements into relief measures for future application.

a. Some years ago a fire door, with automatic release, was devised for use in shafts, and actually employed in several instances. It was 8 inches thick and iron sheathed, and was designed to save a shaft from burning with the shaft-house. Some such device, placed between levels as well, would be invaluable in isolating various portions of the shaft.

b. Where adit tunnels exist, outside connection to water supply should be provided and fitted with couplings and hose, if the conditions are such that in a possible contingency this supply may be required.

c. If pressure is not ample for this purpose a small hand force pump (about 3-inch barrel), or, if there is electric power in the mine, a 3 K. W. motor with 12-inch centrifugal pump should be at hand.

d. For surface water supply a main should be laid, when practicable, from some neighboring mine, with such connections to pumps and hydrants that water can be furnished by either mine for the other's need. This seems to be a fair case for co-operation among several adjacent properties, lessening the expense and increasing the efficiency of protection against fire.

In the case under consideration relief measures would have been more effective if the means had been more promptly at hand, and hence the following observations:

e. Underground connections with other mines are to be avoided; but where they exist they should be fitted with heavy, air-tight bulkheads, with passage traps if necessary. Main airways should be supplied with tight doors. In stoping close to boundary lines it should be a first principle that a solid pillar of rock between mines is the best of protections, since ordinary filled ground will leak enough air to keep a fire alive for months.

f. A hand extinguisher should be kept at every dry station.

g. A tank car and a hand pump should be at hand for use in tunnels or levels.

A few hundred dollars invested in simple provisions of this kind would serve as a most efficient insurance premium.

Mr. Channing has written adequately of the advantages of close bulkheading, which will unquestionably remain the standard method of fighting underground fires; but there are cases, like the one here described, in which the complete exclusion of air is not practicable. In such cases the policy outlined above is worthy of consideration, namely, that of choosing the best point of attack and partially bulkheading, so that fire and gas may draw away therefrom, making approach possible from that quarter. At the time of this writing, exactly a month after the breaking out of the fire, the shaft, from 15 feet above tunnel level downwards, is open and is operated by a temporary hoist; the old hoist station, which had caved full, has been opened; the machinery has been removed and is now undergoing repairs, and for three weeks ore-mining has been recommenced in the upper levels, the product being handled through improvised chutes. With attempted bulkheading we should have been entirely excluded from the mine, and to-day but just beginning to be able to estimate our loss.

*Trans. Am. Inst. M. E., Colorado meeting, September, 1896.

Scientific Progress.

Transcontinental Arc.

A telegram comes from Washington to the effect that the Coast and Geodetic survey has just concluded its labors in the field upon the geodetic survey undertaken and known as the Transcontinental Arc, and lies along the thirty-ninth parallel of north latitude, extending from ocean to ocean. Its eastern end is at a point on the Atlantic ten miles south of Little Egg Island lighthouse, below Cape May, and its western end is six miles north of Punta Arena lighthouse, on the Pacific, above San Francisco. According to the radius of the thirty-ninth parallel, as given by Bessel, the astronomer of Germany, who first calculated the diameters of the earth, and measured the distance from the earth to 61 Cygni, the nearest fixed star, the length of the arc, as measured by the Coast and Geodetic Survey officials, is 111 feet in error, and according to the radius of the same parallel, as fixed by Sir Andrew Clarke of Glasgow University, the error is 98½ feet. But General Duffield, superintendent of the survey, declares that these variations from the heretofore established standards show error in them, and not in the calculation of his scientists.

The value and vastness of the work just accomplished cannot be intelligently appreciated by the unscientific mind. It was inaugurated by the survey officials nearly, if not quite, a century ago. Progress upon it has been spasmodic, but some work has been done every year since the beginning. It has cost the Government about $1,000,000, but the expenditure is said by the officials to be fully justified by the importance of the project. Russia and China are the only other countries on the globe where a base line of anything like equal magnitude is possible, and in neither one is it likely to be surveyed for many years. The longest base line heretofore surveyed was that in India, running north and south about a thousand miles in length. European scientists have been greatly interested in the progress of the American arc, and its completion will doubtless be the occasion for many congratulations from abroad.

Accuracy of Chemical Analysis.

F. P. Dewey of Washington, D. C., in a paper read at the September meeting of the American Institute of Mining Engineers on "The Actual Accuracy of Chemical Analysis," gives many illustrations of the different results obtained by different chemists from the same substance. In one case of examination of gold and silver in copper materials he says: "Summing up, we have twenty-six results by twenty chemists, working by two main methods, each by a single chemist, varying from 135.38 to 122.88, and averaging 127.94 ounces per ton; the extreme variation was 12.5 ounces per ton, or 9.77 per cent of the average determination.

In the case of the silver assay of the copper borings, nine chemists reported by the scorification method, with and without corrections. The averaged results varied from 164.35 to 154.40, and averaged 159.36 ounces per ton; the extreme variation was 9.95 ounces per ton, or 6.24 per cent of the average.

Fifteen chemists reported sixteen results by combined wet and scorification methods, with and without corrections. The averaged results varied from 161.40 to 148.50, and averaged 156.48 ounces per ton; the extreme variation was 13.9 ounces per ton, or 8.88 per cent of the average. A single chemist reported 161.35 ounces per ton by combined wet and crucible process, corrected for slag and cupel.

Summing up, we have twenty-six determinations by twenty chemists, working by three methods, ranging from 164.35 to 148.5, and averaging 157.67 ounces per ton; the extreme variation was 15.85 ounces per ton, or 10.05 per cent of the average determination.

Twenty chemists, working by the four methods, reported twenty-six results on the gold in the matte, varying from 2.41 to 1.85, and averaging 2.245 ounces per ton; the extreme variation was 0.56 ounce per ton, or 24.94 per cent of the average.

On the gold in the copper borings, twenty chemists, working by two main methods, each one variously modified, and the combined wet and crucible method by a single chemist, reported twenty-six results, varying from 0.501 to 0.205, and averaging 0.307 ounce per ton; the extreme variation was 0.296 ounce per ton, or 96.4 per cent of the average determination.

Mr. Dewey quotes some tables of results on soil analyses, published by the Association of Official Agricultural Chemists, one of which is as follows:

TABLE OF AVERAGES—SOIL SAMPLE NO. 2.

	PROVISIONAL METHOD.						HILGARD METHOD.					
	No. included		Average	Highest	Lowest	Difference in per cent of Average.	No. included		Average	Highest	Lowest	Difference in per cent of Average.
Insoluble matter	14	% 76.874	77.233	% 79	% 76	3.3	12	% 76.919	77.910	% 80	% 75	6.3
K_2O	13	.405	.510	.670	.350	54.08	11	.831	.670	.680	.350	54.08
CaO	13	.440	.645	.680	.350	53.10	10	.838	.680	.680	.350	54.08
MgO	11	.425	.560	.627	.330	72.70	9	.435	.627	.627	.330	72.70
Fe_2O_3	9	.504	.600	.640	.400	38.10	7	.347	.400	.400	.300	38.10
Al_2O_3	9	.613	.600	.640	.400	38.10	6	.385	.400	.400	.300	38.10
P_2O_5	6	.210	.320	.330	.300	9.10	4	.338	.320	.330	.300	9.10
Fe_2O_3, Al_2O_3 and P_2O_5	7	7.500	11.400	11.600	11.200	1.75	6	7.510	11.071	12.100	10.590	14.35
Nitrogen	5	.496	.754	.910	.600	20.70	3	.460	.490	.490	.490	0.00
P_2O_5, Goss method	15	.410	.382	.425	.330	25.00	10	.382	.425	.467	.276	51.00

Impossibilities Made Possible.

"Impossibilities made possible by means of the modern inventions in the electrical field" furnished the theme of a lecture by Prof. G. Queroult in the Paris Academy of Sciences. During some of his experiments he hit upon the idea to turn around photographic records and also the series of pictures seen through the kinetoscope, respectively the kinematograph. Having photographed a plant at regular intervals and shown in the kinetoscope the growth, the development of the stem, leaves, buds, flowers and fruit, the same consequence of photographic pictures reversed was presented to the eye of the astonished academicians, who wondered at the fruit turning into flowers, flowers into buds, buds drawing back into themselves and disappearing, the leaves closing, getting smaller and disappearing, the stem getting shorter and shorter, until the earth closed over it. The most incredible things are developed before the eyes of a spectator, if a most ordinary series of pictures is reversed. A drinker takes up an empty glass and replaces it full upon the table; a smoker sees the stump of a cigar flying at him from the floor, takes it to his mouth and sees the smoke originate in the room, draws it up to his mouth and into his cigar, which is gradually lengthened and finally replaced in the pocket. A wrestler, who has probably thrown away his garments, is recovered with them by their, so to speak, walking up on him into their places, while he himself performs motions of

which we can understand nothing, because we never saw these most ordinary motions performed backward; a man, for instance, seated at a table before an empty plate, works hard taking bite after bite from his mouth, until the chicken is whole again on the dish before him, and the side dishes are also returned full to their respective places. In order to fully enjoy an exhibition of the kinetoscope such an exhibition should be arranged alongside each other, the same scenes in regular order in one machine and reversed in the other. It would be advisable, however, to inform the spectators previous to their looking at such a reversed series of pictures, for otherwise they might think themselves the victim of a dream, a hallucination, or something worse.—American Journal of Photography.

SOME six years ago M. Vallot erected on Mount Blanc, 1,400 feet from the summit, or 14,381 feet above sea level, the highest meteorological observatory in Europe. Having made twenty-one or more ascents of the mountain, and obtained observations during three successive summers, he now generally offers the use, not only of laboratory and instruments, but of kitchen and salon, to meteorologists of any nation who care to pursue their investigations amid such exalted surroundings. Intending visitors are advised to provide themselves with a somewhat substantial smelling bottle in the form of a steel tube filled with compressed oxygen, the approved remedy for mountain sickness being to inhale a few quarts of this enlivening element. Four Frenchmen, three Swiss, a German, an Italian, and an American have already availed themselves of M. Vallot's invitation, which is presumably for the summer months.

A SOLVENT for gold and silver which owes its efficiency to the presence of potassium cyanide is claimed by Johnes Atkins, and is produced by heating a dry mixture of one part of potassium ferrocyanide with about two parts of salt to incipient fusion. The product is poured into molds, and is quite stable in the air. For use it is dissolved in water.

THE British Admiralty authorities are still conducting experiments with a view to overcome the difficulties experienced in obtaining satisfactory results with ordinary gauge glasses, owing to the extremely high range of temperature with the new type of boilers. The coating of the inside of the tube with white of egg is stated to have produced the most satisfactory results, by simple means, up to the present.

Electrical Progress.

Manitou Tunnel Power Plant.

During the past few years over fifty companies have installed electric power plants in the Rocky mountains for mining and ore reducing purposes. One of those lately installed is a plant at Manitou for supplying the Strickler tunnel. The station, which is illustrated in the accompanying cut is above the Iron Springs Hotel at Manitou, Colorado, and consists of a 500 H. P. Pelton wheel direct connected to a General Electric Company generator. The wheel runs under a head of 600 feet and is speeded at 600 revolutions.

The power thus generated is carried a distance of eight miles and runs an air compressor for supplying the drills operating in what is known as the Strickler tunnel, which is being driven through a spur of the Pike's Peak range. This tunnel is 6400 feet long and forms a part of the new water works system of Colorado Springs. Operations on the tunnel are carried on from both ends, and light as well as power is supplied from the station for the power house, as well as all underground work.

This is believed to be the first instance in which the resources of water power and electricity have been brought to bear upon a project of this character. The facility it has afforded for the rapid and economical prosecution of the work has been a gratifying surprise to all interested in the enterprise.

The 13-inch main supplying Colorado Springs carries a pressure at the reservoir of 170 pounds, which it is now proposed to utilize, by means of Pelton wheels and electric generators, for lighting the city.

THE usual thing has happened with the French motor-car demonstration. More than two-thirds of the conveyances have already been disabled and have given up the contest. It will be remembered that the same result was the case in the races which took place in the United States, only, perhaps, still more accentuated. The truth seems that we have not yet been successful in evolving an even fairly satisfactory vehicle of this description. Of the three principal types, steam is cumbrous and troublesome; the carriage and storage of light oils is difficult and dangerous, while heavy oil vehicles add to their other disadvantages that of creating a nauseous smell. Add to the foregoing the fact that the vehicles are very expensive, and it will be recognized that the promised street revolution is not likely to create any great shock by the suddenness of its inauguration.—Industries and Iron.

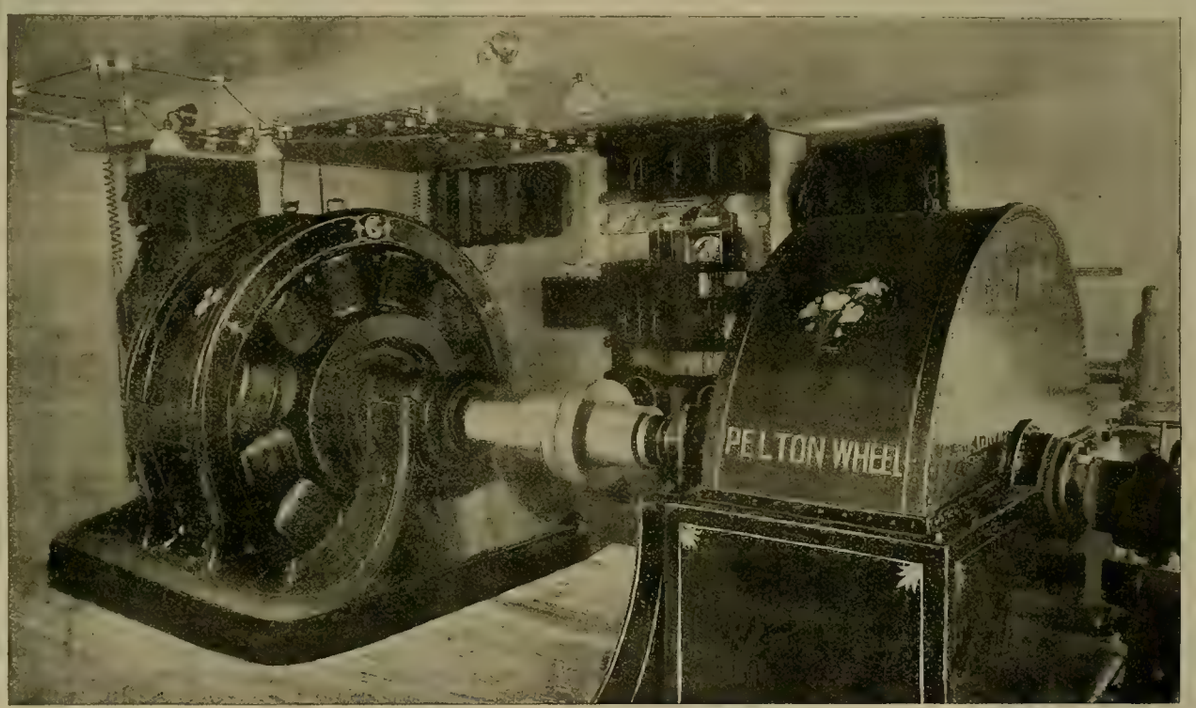
Mechanical Progress.

Hoisting Six Barrels a Minute.

In grist mills and grain elevators there are endless belts, running from a lower to an upper floor, and provided at short intervals with small metal buckets, which scoop up flour or wheat or some similar commodity. In this way transportation is automatically effected. In ore-crushing mills, too, we have horizontal belts, without buckets, to convey material from one machine to another or from a crusher to a bin. Still another form of conveyor is now coming into use. It is designed to handle barrels and grain sacks, and lift them from one floor to another. This device consists of a broad rubber endless belt, from whose outer face project pairs of arms or brackets, the two arms of each separate pair being nearly two feet apart. The barrels or sacks are laid or rolled, one at a time, on to these supports. It is possible to adjust the apparatus so that it will deliver its load at any floor above the starting point.

It is necessary to have an attendant remove the freight as fast as it comes, but the operation of placing the barrel or sack on the floor in front of the opening through which the conveyor comes through the floor is performed automatically. Inasmuch as the belt runs exactly up and down, and not slantwise, and as the brackets are shaped alike above and below, the device can be employed for sending merchandise down again from the storage lofts without reversing the direction in which the belt runs. In fact, both hoisting and lowering can be done at the same time. Eight of these elevators were recently put into a big sugar refinery in Philadelphia. They reach up through eight floors. Each one is capable of handling 375 barrels an hour, or about six to the minute, in either direction. In other words, it is nine or ten seconds from the time that one barrel of sugar rolls off from the belt to the arrival of the next one. These conveyors, of course, can be adapted to the carriage of all sorts of miscellaneous parcels and bundles.

THE utilization of waste slag is one of the great problems of technology. The German Association of Cement Workers has recently taken up the study of this important matter and some interesting progress has been made. In the valley of the Saar a slag of suitable composition is produced and can be properly granulated. Two factories are running on this product. The slag costs about $1.32 per barrel in fifty-ton lots. The slag cement is lighter than Portland cement, and runs about 330 pounds to a barrel. The official tests show that the slag cement gives excellent results in foundation work, but it does not do so well when freely exposed to the sun and atmospheric influences. A good deal of the slag cement is used in making paving tiles, bricks and blocks. These consist of a mixture of gravel, sand and slag cement in various proportions, moulded wet and hydraulicly pressed. The cost of these paving tiles is about 72 cents per square yard. The use of slag in road making is well worth careful attention in this country.



MANITOU TUNNEL POWER PLANT.

NICKEL-STEEL promises to be the building material of the future. For pieces of machinery which may suffer from a sudden fracture its elasticity makes it particularly adapted. It is being largely used in the machinery of locomotives and machine engines. It withstands salt water better than steel. A steel surfaced with nickel is giving excellent results in this direction. By coating nickel-steel with nickel the galvanic action caused by exposure to sea water is avoided. Nickel-steel wire is used for the nets which are hung about men-of-war as a protection against the attacks of torpedoes. The exterior of the rings of the 5000 H. P. dynamos of the Niagara Falls Power Company, which travel at an immense speed, are made of nickel-steel. In cannons it has proved a great success, and also in the heavy armor now used in men-of-war. Unfortunately, the high price of nickel-steel prevents its general use.—The Brooklyn Manufacturer.

A FEW months ago we drew attention to the creation of a large locomotive industry under American auspices and control, four miles from Nijni Novgorod. Now it is announced that an American company has been formed, with a capital of $2,500,000, to secure

control of valuable manganese mines at Nicopol, in south Russia. The one to be taken is close to Mariopal, on the Sea of Azov, where a large steel plant is about to be erected under the supervision of H. S. Lond, formerly of the Illinois Steel Company. The company has, it is stated, already secured an order for 144 miles of oil pipe, amounting to some 10,000 tons, for the Caucasus, and the machinery for the manufacture of this is being shipped from the United States.

Practical Information.

A French Decision on Subsidence.

The owner of some land at Ovion, near Lens, in the Pas-de-Calais, France, under which the Lens Colliery Company has worked several seams, proposed in 1892 to build a brewery; but the Lens Company, asserting that the surface was undermined by workings, served him with a notice to the effect that, in order to warn him of the possible damage by subsidence to his proposed building, for which the company would not be responsible, it offered to agree to an indemnity for the depreciation of his property through becoming unsuitable for building owing to the underground workings. As the owner protested against this attempt to restrict his free exercise of the right of surface ownership, the Lens Company entered an action before the Bethune Civil Tribunal with the object of obliging the owner to receive an indemnity for depreciation, or of disclaiming its liability in the event of his refusal; but this application was refused in February, 1893. On the company having recourse to the Douai Court of Appeal, that body decided, in November, 1893, that a mine owner has the right to free himself of all future responsibility by offering an indemnity for any depreciation caused to property. The Supreme Appeal Court of France, however, has reversed this decision on the ground that the surface owner must not suffer on account of underground workings, but preserves the right to employ and dispose of his property in the most absolute manner, and that it is not for the mine owner concessionnaire to fix the moment for establishing the indemnity for future and eventful damage.—American Manufacturer.

THERE are 70,000 postoffices in the United States, against 20,000 in Great Britain, 25,000 in Germany, 9000 in Austria-Hungary, 7000 in France and 6000 in Italy. The net loss on the postoffice business of the United States amounted last year to $10,000,000, the shortage being made up by appropriation by the Treasury, which has averaged in recent years about $6,000,000. The profit in the English Postoffice Department for the same period was $15,000,000, and other countries of Europe make a profit from the postoffice also. The net revenue in Austria-Hungary was $5,000,000, in Russia $1,000,000, and in France $7,500,000. The revenue of the English Postoffice, including in this amount the revenue from telegrams, which is a Government monopoly in England, was $70,000,000 last year, of which $15,000,000 was from telegrams. The receipts of the American telegraph companies are in excess of $25,000,000 a year, and, if added to the postal receipts, as is the case in England and Germany, would make the revenues of the Postoffice Department over $100,000,000 a year.

PROFESSOR HOGG, of Fort Worth, Texas, writes of the benefits railroads have conferred on the people, and claims that they have cheapened the necessaries of life to consumers. One day's wages will pay the cost of bringing a whole year's provisions from St. Louis to Baltimore. Retail dealers get more profit from handling flour, beef, ham, tea, shoes or clothing than do the railroads for hauling them 1000 miles. They protect us against scarcity prices and famine by supplying the deficiencies of one region from the superabundance of another. They increase the pleasure of life by facilitating travel at rates that suit the poorest purse. American railroads are operated, in fact, at rates that give little or no profit to their owners. Abroad rates are much higher. Freight rates are three times as high in England. Passenger rates show a like advantage to the American traveler. As respects military defense, railroads are immensely beneficial. They save the expense of maintaining a large standing army by the facilities they give for the concentration of troops. In time of war they do an indispensable work in the transportation of troops and provisions with speed and certainty. Professor Hogg, in stating that freight rates in England are three times as high as in this country, seems not to be aware that the charges in England include, not only actual freight, but also the cost of drayage at both ends. Each of the great railways of England maintains an immense number of drays, with the finest draft horses in the world. One who wishes to ship goods from his residence or a warehouse in any part of Liverpool to any given address in London, for example, needs only to give notice to the railway company. Their dray will call for the goods, which will be delivered in London by the company's drays there. The freight charges include all costs of drayage. One great advantage to the shipper is the saving of bother about having the goods taken to and from the depots at the shipping and delivery points, and another is the certainty that the goods will be more carefully handled by the railway company's drayman than they would be by others.

THE exports of British tinplate to the United States during three-quarters of the present year, compared with those for a corresponding period in 1895, show a decrease of more than 46 per cent. Following are shown the total exports of tinplate from Great Britain to the United States for the past five years up to and including September, 1896:

Month—	*1896.*	*1895.*	*1894.*	*1893.*	*1892.*
January.....	11,861	18,626	18,296	23,498	17,554
February....	6,980	23,201	13,413	20,190	22,268
March.....	8,903	18,743	16,907	31,334	22,789
April.....	10,903	15,946	13,210	31,651	31,061
May.....	9,222	18,118	21,291	26,988	23,799
June.....	11,753	13,760	17,247	26,759	23,550
July.....	13,930	16,445	17,805	22,248	24,750
August.....	8,814	23,531	19,125	15,784	24,221
September..	7,167	17,507	17,672	13,789	22,535
October.....	.....	19,805	24,854	13,861	19,901
November...	.....	16,186	22,382	15,495	20,634
December...	.....	21,033	24,677	14,031	23,417
Totals...	89,533	222,901	226,879	255,628	276,479

CONDITIONS point to an increased area and growth of woodlands throughout New England. The old practice of clearing forests and burning the wood for making settlements and homes has passed away. The many acres of rough and rocky sidehill land have already been cleared in generations now past. Thousands of what are called farms would have been doubly valuable had they been cultivated for timber instead of grass. Wood is not consumed for fuel to the extent it once was. Railway locomotives burn coal instead of wood. A vast proportion of the area of New England is natural forest land. Keep out the fires and we may have successive crops of wood and timber for all time. The ax properly handled is the friend instead of the enemy to the forest. Our forest products are only valuable as they may be utilized by civilized humanity.—Northeastern Lumberman.

CAPT. WILLIAM B. HILLER of New York states that on July 1 last he discovered, some 500 miles off the coast of Labrador, the celebrated Leary raft, which was lost some years ago. It was headed southwest, he says, but was not making much headway. The raft is larger than any ocean liner, and it would be an ugly customer to meet under the conditions of a twenty-knot gait and a dark night. Other mariners and the collector of New York laugh at him and declare the raft broken up long ago. James D. Leary of St. John dock fame, who first conceived the plan of transporting lumber at sea by means of a raft, was recently interviewed. "I think Capt. Hiller's story to be very probable. I was employed personally in the construction of this raft, and I know that it was constructed as strong as—if not stronger than—many ocean steamers. Its general compactness and solidity made it almost as inseparable as one great, massive log."—Northeast Lumberman.

IT is stated that the Greek Government has recently received several applications for the granting of mining concessions, and that an English company is negotiating more especially for the concession of an iron mine.

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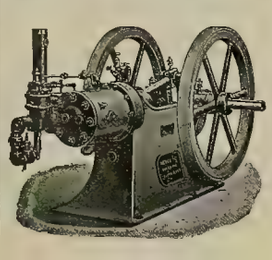

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Coast Industrial Notes.

—The steamer Arago was wrecked at Coos Bay, Or., last Tuesday, while en route to this city, and is a total loss. Twelve lives were lost.

—Last week 500 tons of beans were shipped from San Francisco to Liverpool. This is said to be the first direct shipment of the kind from California.

—The San Francisco Chamber of Commerce is about to memorialize Congress asking a subsidy for American ships to carry mails across the Pacific ocean.

—A proposition to bond Tuolumne county for $100,000 for twenty years, to be used in building a road from Sonora to Knight's Ferry, is before the people of that county.

—The Pioneer Electric Power Company is about to build an electric railway to Salt Lake City, Utah, in connection with its electric transmission line, to be built from Ogden to the same city.

—The first carload of this season's crop of oranges was shipped last Monday night from Los Angeles to Chicago, four weeks earlier than ever before. The fruit is from the Cahuenga valley.

—Santa Barbara Consolidated Electric Company stockholders will hold a special meeting next Saturday on the question of bonding the company in the amount of $150,000 and of executing a deed of trust.

—Henry Hewitt, treasurer of the St. Paul & Tacoma Lumber Company of Tacoma, is going to the Orient to establish branches for his company in Hawaii, Australia, Japan, China, India and South Africa.

—The great rise in wheat culminated last Wednesday, December wheat selling at $1.50; other cereals are higher in sympathy. Flour has advanced from $3.65 to $4.90 per barrel. Shortage in India is the cause of the wheat advance.

—A line of steam schooners is to be put in to run between San Diego and Panama, stopping at way ports. San Diego will be the principal port of entry, and the trade of San Diego and Los Angeles counties will be catered to.

—The deed conveying the title to the Citizens' Railway and the Santa Barbara Street Railway to the Consolidated Electric Company has been filed for record and calls for $35,000, to be paid in bonds of the Consolidated Electric Company.

—Plans and specifications for water and electric works at Anaheim, Cal., are being prepared. As soon as bonds are sold, bids for both systems will be called for. Engineer C. S. Rogers, Anaheim, is preparing the specifications for the water works.

—The South Coast Paper Mills have placed in position the first installment of machinery necessary for the proposed manufacture of manilla fruit and rag wrapping paper. The entire plant for the new process will cost $3000. It will increase the daily output by two tons and give employment to increased hands.

—Eastern capitalists having signified a willingness to invest $300,000 in the proposed electric road between Sacramento city, Orangevale and the Fair Oaks colony, providing the citizens of Sacramento would take $50,000 of stock, that sum was raised with but little trouble. It is understood that if satisfactory arrangements are made, work will be commenced upon the new road immediately.

—The recent exposition at the Mechanics' Institute Pavilion was a financial as well as an industrial success. About 300,000 people visited the Exposition. The ticket office receipts were $35,250. The entire expenses were $27,000. To determine the six most popular exhibits 49,329 votes were cast. The winners were the Joshua Hendy Machine Works, Johnson-Locke Co., American Biscuit Co., Crown Flour Milling Co., Union Iron Works, and Fulton Engineering and Shipbuilding Works.

—In this city last Monday the case of the Oregon & California Railroad Company and others vs. the United States, known as the Overlap Land case, was decided adversely to the Government. Judge Ross rendered the opinion, concurred in by Judge Hawley, reversing the decision of Judge Gilbert of the Oregon Circuit, and remanding the case to the lower court with directions to dismiss. Judge McKenna rendered a dissenting opinion, holding, with Judge Gilbert, that the Oregon & California Railroad Company never had a legitimate claim to the land patented to it by the Government, under the Congressional act of 1866, but the rights of the Northern Pacific Company still existed, under the grant of 1864, because they had never either been exercised or abandoned. The land involved in the case is about 200,000 acres in the vicinity of Portland, Oregon. Because of the divided opinion of the four judges in the matter, the case will probably be carried to the U. S. Supreme Court for final hearing.

—The asphalt deposits in Santa Barbara county, this State, recently described and illustrated in these columns, have been sold by the Alcatraz Asphalt Co. of this city to English investors represented by Percy Tarbutt and Edmund Davis. The three asphalt mines, Las Conchas, La Patera and Sisquoc, contain large and pure deposits of valuable commercial asphalt, some of which has been used on street pavements in this city. The '95 product was 24,000 tons, worth $140,000. The supply is apparently inexhaustible.

Personal.

THOMAS WEIR is the new manager of the Highland Boy, at Bingham, Utah.

E. B. PRESTON of the State Mining Bureau is at Hayden Hill, Lassen county.

LOUIS JANIN, Jr., is expected to arrrive here from London in a few days on his way to Australia.

JOHN TREADWELL has been appointed superintendent of the Keystone mine, in Amador county.

E. J. MURRAY, who has been in Shasta for some time, left last week for Mexico to take charge of the Santa Rosalie mine.

D. B. HUNTLEY succeeds the late Captain John W. Plummer as manager of the De Lamar Mining Co., De Lamar, Idaho.

REAR ADMIRAL J. C. WALKER, representing the navy, A. F. Rogers, representing the Coast and Geodetic Survey, and W. H. Burr, G. S. Morrison, R. P. Morgan, appointed by the President, constitute the commission to determine the location of the harbor for Los Angeles, Cal.

HAMILTON SMITH of the Exploration Company of London, according to present arrangements will arrive here about the middle of next month. It is some six years since he was in California last. Mr. Smith and H. C. Perkins have formed a partnership as consulting mining engineers. Mr. Perkins will make his headquarters in Paris. He was for a time at the North Bloomfield mines, in Nevada county, with Mr. Smith, and has lately been in South Africa in charge of some of the largest mines there. He has made a fortune since he left here.

Recent California Mining Incorporations.

Kaolah G. M. Co., S. F.; C. W. Tyron, J. S. Drake, F. C. Gebricke, H. H. and W. B. Lee; capital stock, $2,500,000, all subscribed.

Golden Bell Mining Co., S. F.; E. L. Berry, C. F. Bunker, G. W. Osborn Jr., H. Nolt, A. G. Walsh; capital stock, $250,000--$25 subscribed.

Confidence G. M. & M. Co., S. F.; M. Schwitzer, A. Hamilton, S. Silverberg, K. J. Turner, F. Quisling; capital stock, $2,000,000, all subscribed.

Anglo-California Mining Company, S. F.; I. S. Cowles, W. McGill, D. B. Chase, J. Dankin, P. D. and C. G. Nagle; capital stock, $2,000,000—$1,300,000 subscribed.

Recently Declared Mining Dividends.

Alaska-Treadwell, 37½c per share, $75,000; payable October 28th.

Alaska-Mexican Co., 10c per share, $18,000; payable October 28th.

The Boston & Montana Mining Company, Montana, regular quarterly of $2 and an extra of $1 per share, a total of $450,000. This makes an aggregate of dividends to date of $4,925,000.

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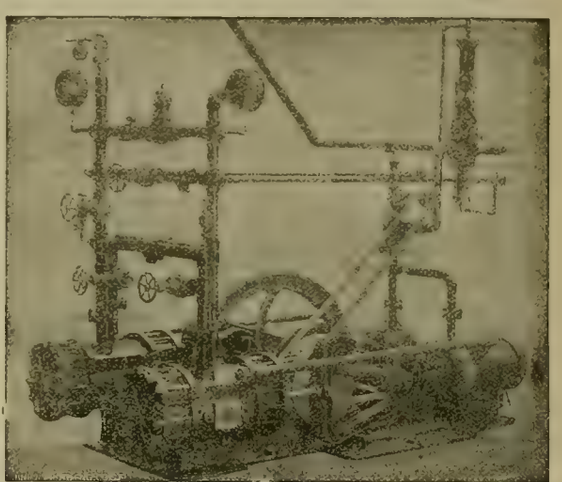

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Mining Summary.

CALIFORNIA.

Amador.

The Sunset Mining Co. is about ready to commence operations on the south fork of the Cosumnes river, Amador county. The prospects are flattering as to the yield of gold. The only drawback apparent is the immense number of huge granite boulders to be handled. An experienced superintendent claims that this can be remedied, and the Sunset will soon be reaping rich returns for their outlay.

Republican: Sinking has been resumed at the Alma mine, after a week's prospecting with the diamond drill. The drill was run in an easterly direction about 140 feet, over 20 feet of which was in quartz and ledge matter. A heavy flow of water was also encountered. The quartz is reported to have yielded flattering prospects. The situation was reported to the San Francisco office, and orders were telegraphed to suspend operations with the drill and renew work in sinking the shaft. It is the intention to sink to a depth of 1000 feet, and crosscut to the ledge at this depth. Indications all point to the development of a permanent mine at this point.

Republican: Some twenty to thirty more men have been employed at the large plant of the Blue Lakes Water Company's ground above Big Bar bridge, on the Mokelumne river, making near 100 men. They propose to push everything, in order to get the foundation laid before the rainy season sets in.

Record: C. A. Roberts, who has bonded the Loyal Lead, better known as the Black Hills mine, intends to begin operations right away and to sink a shaft 1000 feet. The contract has been let for timbers and other supplies.

Republican: The Pocohontas mine is down about 80 feet. They are at work sinking a new shaft. Hoisting works will soon be erected.

The White mine, above Big Bar, is running night and day sinking.

At Butte City a 10-stamp mill has been erected, and the mortars are in place, but the stamps are not yet in position. Zambral and Zeek from Cincinnati are at the head of this enterprise.

Ten or twelve men are employed by the Butte Basin Tunnel Company. The tunnel is in 600 feet in hard black slate. The company has built several houses for living and sleeping purposes near Big Bar bridge to accommodate the three shifts of men that are pushing this work. The tunnel is making headway at the rate of 8 to 10 feet per day.

At the Anita mine the east crosscut has been driven 60 feet, with no change in the character of the formation. It was expected to encounter the ledge between 40 and 50 feet, but the ore body is believed to run considerably flatter than was anticipated.

At the Alma they have commenced to crosscut for the ledge at the depth of 800 feet, using the diamond drill.

Quartz mining in the Clinton district is on the increase. The claim owned by the Mason Mining & Milling Co., the stockholders of which are mostly Woodbridge capitalists, was started last week under the management of H. W. Tangerman. Seven men were put to work cleaning out a tunnel 450 feet long.

The Madden and Ratto mines are likely to be started shortly.

The Union Consolidated has started ten stamps of their 30-stamp mill and are going to run day and night. They have commenced to cut stations at the 400-foot level, and will soon commence stoping east and west. The chlorination works are also being fitted up for immediate use, if necessary.

Butte.

Mercury: A 6-foot ledge has been struck at the Denver mine that is very rich. There are thirty men employed on this property.

The Rockford mine at Humbug is reported very rich, and the property will in a few weeks put in an extensive plant to handle the ore.

The rumor of a rich strike in the Golden Queen mine, which recently came into the hands of H. P. Stow, is confirmed. The ledge was struck on the 300-foot level. Mr. Stow, who has over one hundred men in his employ, is so elated over the strike that he has raised the wages of his men to $3 per day.

Fourteen men are employed at the Morning Star mine, above Yankee Hill. They are making extensive preparations for a big run on quartz as soon as sufficient machinery can be had.

Victor Pomerat has a small claim above Contolenc which he has been prospecting. A few days ago his labors were rewarded by an 18-inch ledge of white quartz that will assay very high.

Mercury: On the west side of the Feather river, in South Thermalito, there are three mines in active operation.

George Ditzer has ten men employed, W. P. Hammond twelve men and W. Treat fifty men. The latter are working day and night. The deep, fertile soil is removed in some places to a depth of 20 feet and then the pay gravel is reached below this. The earth is hauled off in wagons or run off in cars moved by steam power.

Calaveras.

Citizen: Hackett, Thompson & De Golyer have paid on the bond on the Don Allan mine $17,000. A 15-stamp mill has been erected, and other improvements made. There is a large body of low-grade ore available on the surface of the mine, and strong indications that it will concentrate and improve in depth. The formation is a blocky porphyry, radiated with quartz kidneys, veins and stringers, the whole mass carrying free gold at one place nearly 300 feet in width. It is reported the test made in the new mill averaged over $4 per ton.

Active operations on the Gum Boots mine, on Indian creek, were begun last week. John Nuner of Mokelumne Hill was awarded the contract to run a tunnel on the ledge for a distance of 150 feet.

Preparations are being made to begin work at the Mienecke gravel mine, near Vallecito, as soon as the winter rains begin. A reservoir is being built and thirteen men are preparing for hydraulicking.

Prospect: The old What Cheer blue gravel mine near Mokelumne Hill has been incorporated and work will soon be resumed. This property, which has been closed for a number of years, was worked more or less by many different companies who in no instance had the money with which to carry on the work properly.

It is reported that there is a 4-foot vein of rich quartz in the winze at the Lone Star mine at West Point.

Chronicle: At the Mitchell mine three shifts are driving the tunnel ahead and good ore is being encountered. A new boarding house and sleeping apartments have recently been built. It is expected to start the mill up on the first of December.

As soon as the machinery arrives, which will be in a few days, active operations will be resumed on the Petticoat mine.

El Dorado.

Nugget: George Clark is erecting a mill at the Saginaw mine. He has made a good prospect of the property and is satisfied that he has a good mine.

The new purchasers of the Amazon mine, near Kelsey, are preparing to work it.

The Lone Jack trouble having been settled, it is expected that the mine will be worked to full capacity in a short time.

Democrat: Beach & Co. have contracted with Greater, Cook and Elvidge to furnish lumber for a 10-stamp mill on a mine in Chili ravine bonded from John Pascoe.

Republican: E. C. Suman has purchased the Probert mine, near Latrobe. This piece of property is a ledge recently discovered there and which furnishes some fine prospects.

The contractors for the American River Co. are busy sending logs down the chute into the river, to fill their contract for supplying 10,000,000 feet. The force is so great that some of the logs checked by exposure to the sun explode and break into fragments on striking the water.

It is reported that the owners are to start the Blue Bird mine, near the Sciaroni.

They are still working the Baltic mine. Sixteen men are employed. The Baltic mill is nearly completed.

Mariposa.

(Special Correspondence).—On the Mariposa grant J. D. Ludwig continues to get matters in order for inspection at the Josephine mine. Some very promising new prospects are being opened up at Mt. Ophir. It is understood that Senator John P. Jones' political engagements will not admit of his accompanying Hamilton Smith on his visit of inspection until after the election.

Chas. T. Lindner, the general manager of the Mariposa Electric Power Company, is now in charge at the camp at Broadhead old dam. Men are at work on the aqueduct, and Mr. Lindner is securing contracts from mine-owners for the use of the power.

The Merced Gold Mining Company continues sinking in the various shafts—three eight-hour shifts in each. The company is testing ore in bulk samples, principally from the Mary Harrison. For this purpose ten head of stamps are kept running at the Potosi mill. Captain Thomas Couch is expected here shortly to resume charge of the company's operations.

Goodall, Perkins & Co. have bonded several more claims at the lower end of Hunter's valley, including the old Dulce mine. In all the claims they have bonded a covenant is made for continuous work, and the scope of their operations is already large. So far as they have gone, they are well satisfied with the prospects. Samples assayed show the rock to be exceptionally rich. What remains to be proved is its permanency.

Capt. A. H. Ward is again at Pinon Blanco. The tunnel driven from the west side of the mountain to intersect the main ledge is now in about 1000 feet with satisfactory results.

J. J. Dolan is back to the Story mine at Date's Flat. He has men at work sinking in the main shaft from the 100 to the 700-foot level. The tunnel which connects with the shaft at the 100-foot level has been finished. Hoisting machinery is expected from San Francisco in a few days.

The Tyro mill continues to run night and day on rock from the 500 and 700-foot levels from the drifts to the northwest side of the property towards the Merced Company's Malvina mine. Mr. Buttgenbach, the president of the Tyro Company, says that the rock now being crushed is equal to anything that ever came out of the mine.

Chas. Blagburn, M. E., is inspecting a group of claims near the Merced river on behalf of an English syndicate.

At the Tendron mine, in the Whitlocks district (Sierra Buttes Co., Limited, owners), the 20-stamp mill is running steadily. Recently the character and quantity of the rock has improved to an encouraging degree.

Work has been resumed in connection with the Washington, No. 9, Pool and Quartz Mountain mines. The work so far is of a preliminary nature, such as pumping out the No. 9, retimbering where necessary, and getting the machinery in order. On these properties there are thirty-eight head of stamps and all the usual appliances.

The Horseshoe mine, in Hunter's valley (Frank Thorne, superintendent), is sinking steadily, and more than paying its way with the 5-stamp mill that is kept constantly going.

The owners of the Louisiana mine are about to erect a 10-stamp mill on the North Fork of the Merced river, having, by sinking, proved the property to their satisfaction.

Coulterville, Oct. 21, '96.

Nevada.

The Old Home Consolidated mine, in the Blue Cut district, has been worked by the present owners for about a year, and they have made important developments. The fissure is 80 feet wide and contains six different ledges, all of which are coming together as greater depth is reached, and which it is believed will unite lower down and form one large, permanent ledge. The main tunnel has been run into the hill a distance of 700 feet and is still being driven ahead. In about ten days the 5-stamp mill will begin crushing again, and it is expected that it will be kept running steadily.

Transcript: During the flush times of high-grade ores little attention was paid to the great mother lode which runs through Washington district. There are now perhaps twenty claims located along the lode, and among the lucky prospectors who have something to show as a reward for their pluck and perseverance are W. L. Williamson and M. M. Cole, who own the Giant King, situated just above the town of Washington. The Giant King has a pay chute nearly 100 feet wide that will average $4 per ton, and has several tunnels running into it. The ledge can be worked and the ore milled nearly as cheaply as at the Spanish mine. John McCarthy and others own the Paris, San Francisco, St. Patrick and Eureka, all on the north side of the river. Practical mill tests show that with proper development and milling facilities unknown wealth may be extracted from the mines along the mother lode. The work done throughout the district has been of a permanent nature and good results can be looked for later on.

Transcript: At the Champion the two mills, with their seventy stamps, are kept running night and day, crushing quartz. There are now nearly 200 men on the company's pay roll, and the number of miners is being gradually increased as room is found for them. The old Merrifield shaft is being opened up, and when everything is ready for breasting out more men will be employed. In three or four months from now the Champion Company will probably have 250 men at work, enough persons, with their families and others that are dependent upon them, to make a small village of themselves.

Transcript: A mill has been erected at the Metropolitan mine at Orleans Flat which was purchased a short time ago from George Abraham by a San Francisco company.

Placer.

Colfax *Sentinel*: The mill at the Herman mine is running day and night. Twenty-seven men are employed. Work is being done in tunnels No. 1, No. 2 and No. 3. Tunnel No. 4 has been started 400 feet below No. 3 and will be driven in on the ledge 1200 feet.

At the Macedon quartz mine, Black Canyon, a tunnel is being run on the ledge that will give them 300 feet of backs for stoping. Ore has been taken out recently that shows free gold.

The Monte Rio river mine, which consists of about 3000 feet of the channel on Bear river immediately above the South Yuba dam about three miles from Colfax, has been sold to E. W. Chapman for a good sum. The mine was owned by the following Auburn citizens: T. B. Corey, Daniel Kirby, J. W. Morgan, J. L. Rollins, Thomas Morgan and Mr. Hazen.

The shaft at the Occidental mine 2½ miles east of Iowa Hill, at Grizzly Flat, is now down about 70 feet. They expect to strike gravel and bedrock in about a month. Wm. Cameron is superintendent.

About sixty-five men are engaged on the surface and development work at the Dam claim.

Plumas.

Independent: The Bunker Hill mine at the head of Hopkins is paying well and North America, with which it is consolidated, is yielding satisfactory returns. Captain Wm. Meikle is in charge of the consolidation which is now called the "Garnett."

At Gibsonville, gravel was struck in the Squiers shaft last week at the depth of 260 feet from the surface.

Work on the new tunnel at the Sunnyside mine in Butte Valley has been resumed. A force of men are also working in the old drain tunnel, and the superintendent is washing gravel with good results.

Shasta.

Free Press: The Shasta Dredging Company not long ago built a boat on which was placed machinery to hoist the sands of the river bottom by means of a suction pump. After a test the work was abandoned, as the machinery did not provide for the penetration and disturbance of the hard cement or gravel. Now another company has been organized to work the river gravel by a different method, using instead of a suction pump a scoop shovel holding a yard of dirt. To this shovel are attached three prongs, which are forced into the hard cement. The company is known as the Tortillata Gold Mining Company and is represented here by Major J. B. Shoenfelt of Wyoming, who expects to keep two crews at work, and estimates that he can move into the sluices 1000 yards of dirt in twenty-four hours.

The Sunny Hill tunnel is now in about 475 feet and is being driven night and day.

At French gulch the Sutter property will start crushing ore in the Washington mill soon.

Four prospectors have discovered the east extension of the Ellery mine, showing 2½ feet of ore that will mill $50 per ton.

The Gladstone is again having a streak of good luck. They let a contract on their long tunnel and have cut the old ore chute that was so phenomenally rich on the surface, at a depth of 900 feet. They have 3 feet of ore that mills $25 per ton. An effort is being made to settle the liens and claims against the mine and resume operations.

William Johns has endeavored without success to secure the consent of the directors of the Uncle Sam to sink from 200 to 500 feet upon the ledge. He still has faith in the mine, but the directors do not seem to be inclined to expend any money in the further exploration of the property which yielded them millions of dollars.

Sierra.

Enterprise: The old Hawkeye mine, of Howard Flat, owned by Chas. Overstreet and Thos. Todd, is paying well.

Siskiyou.

Yreka *Journal*: The old Madam Clark diggings, long since abandoned, has been reopened by Walker & Falkensteir. They have rigged up the mine with pipe and a giant.

Chamberlain & Timmons started their new mill October 4th. They have about 200 tons of quartz on the dump, which is expected to yield over $20 per ton.

At the Gum Boot mine, owned by Simon Bros. and Schuler, they now have a ledge 10 inches wide and it is gradually widening as they go down.

At the Garrett & Co. mine, at Hamburg Bar, they are working night and day with a force of twenty-five men.

The Columbia mill is crushing quartz from their mine every day.

The Bennett mine, which is located back of Scott Bar, is paying handsomely again.

At the Maplesden Bros. claim, near Hamburg Bar, they are working a large force of men night and day, but as yet have not gotten to bedrock. This mine has always yielded splendidly and no doubt it will do the same this year.

The Grider mine at Seiad has proved a bonanza to its owners this year.

The new mining company at Nolton, on Thompson creek, which recently purchased the old Shiner mine, have a force of fifty-five men at work on their ditch.

The Seattle Placer Mining Company, of Thompson creek, are busy rigging up, to be ready for the fall rains, when work will be commenced and continued all winter.

The Classic Hill mine, owned by Matthews & Vogan, is being rigged so as to be worked on a more extensive scale.

The quartz mine owned by A. Erno, in Quartz valley, to where the 5-stamp mill was removed a few weeks ago, is doing well. The ore which it is producing is rich.

Reporter: It is reported that work on the old Quartz Hill mine will soon be resumed under new management. M. F. Campbell of San Francisco has been negotiating a sale of this property to a New York company, and he will have some development work done while the sale is pending.

Journal: The big French creek ledge has been closed down for some time, as the result was discouraging.

L. A. Moxley, J. Custer and S. Fitzsimmons have discovered a rich ledge in Quartz valley. It is from 6 to 10 inches in width, with free gold.

Trinity.

Journal: Since the litigation for the ownership of the Altoona has ceased the place has been built up from the decay into which it was falling and presents a prosperous appearance. There are about 125 names on the roll of the boarding house at this time, which does not include the men engaged in chopping and hauling. The shaft at the hoisting works is now down 370 feet and men are working night and day.

At the Integral there are twenty men employed. The owners are running a long tunnel in the hope of striking the lode at a good depth. Meantime the hoisting works and furnaces are idle.

Tuolumne.

Independent: The Jumper mine, with its 20-stamp mill, is still showing up magnificently. Recently a chunk of pure gold as big as a man's hand was taken out, and the output this month will be near $200,000.

The Excelsior and Mt. Vernon mines, in the Sugar Pine district, have been bonded to Mr. Epsensperger for his Salt Lake and Denver associates.

The contract let some time since for a crosscut tunnel in the Arbona mine by the Equitable Mining & Milling Company has been completed and has revealed on the hanging wall side a body of exceptionally good ore more than 3 feet wide in addition to a much larger quantity of low-grade rock.

Union-Democrat: The Belleview mine has been shut down for two weeks to place in position boilers for additional power and a large new pump. Just as soon as the new machinery is set up stoping will be commenced and the mill start crushing. The company have levied an assessment of 25 cents per share, and have, during the past twelve months, made a clear profit of $3000 per month, but owing to two estates that own three-fourths of the stock of the corporation being in the Probate Court, all moneys derived from the operation of the mine must be paid into Court and cannot be used for improvements.

On the Whiskey Hill a double-compartment shaft is being sunk. About fourteen men are working now and more will be added as fast as possible. The intention of the operators, as given out, is to go 1000 feet deep before putting up a mill. The power to operate the hoisting machinery will be brought from the company's power plant at the Santa Ysabel group. The men who paid $150,000 for the Whiskey Hill group will push development work on the property.

At the Arbona the crosscut tunnel has cut the ledge and they are now drifting on it. Last Saturday Superintendent Allen stated he had struck an exceptionally rich chute of ore, the best so far found. There are only a dozen men working at present, but more will be put on in a short time.

The boilers for the new 5-stamp mill to be built on the Marconi mine at Groveland were shipped up a few days ago.

The upraise on the Alameda is nearly timbered. This coming week an incline shaft will be started. It will be a continuance of the upraise and will be sent down 400 feet below the tunnel level this winter.

The Mammoth continues to work about the same number of men on the shaft that is be-

ing sunk at the end of the main working tunnel. They are making good progress and will soon be down 600 feet.

The Bella Union, which was under bond to Rosenfeld and Hulsey, has been shut down.

The owners of the Hull mine, near Tuttletown, are building a 6-stamp mill on the property. It was worked formerly and then abandoned.

The outlook at the Groveland property is so encouraging that the talk of building a 10-stamp mill this fall is being again revived.

John Whitney has suspended operations on the Punter for the present.

N. W. Moody of the Mt. Zion Company is about ready to start the mill on the Kanaka mine. His company has a bond on it from L. Cassarretto.

F. Sutton, owner of the Street and Gross mine at Tuttletown, upon which there is a 6-stamp mill, is going to commence work on it immediately. It has a good record as a former producer and is expected to pay handsomely now.

The Goodwin Mining Company are going to start work on the Pennsylvania and Rhode Island claims.

NEVADA.

At the annual meeting of the Con. Cal.-Virginia Mining Company last Monday in San Francisco, the following board of directors was unanimously elected: C. H. Fish, N. T. Messer, H. Zadig, T. F. Fish, and Charles Hirshfield, vice John T. Twiggs, resigned. A revised edition of the by-laws was then adopted, in conformity with recent legal decisions in regard to transfer of stock pending an assessment.

The report of Superintendent Lyman for the year shows there have been extracted from 1600, 1650 and 1750 levels of the mine in the twelve months ended September 30, 1896, 7059¼ tons of ore, providing bullion valued at $211,333.49, showing an average yield of $29.93 per ton. This bullion carried $108,306.45 in gold and $103,027.04 in silver. The coin value of this bullion amounted to $160,686.72. Speaking of the fire which caused more or less trouble in the latter part of last year, Mr. Lyman says that his efforts to extinguish the flames have been successful, and no trouble has been experienced from gas since June and July. The origin of the fire is not known, but the superintendent ascribes it to ground pressure continually crushing and splintering the stope timbers, creating an intense heat, which caused the dry timbers to ignite. The two shafts continue to be in good working condition. The water has risen 10½ feet in the C. & C. shaft during the past year, and is now up to a point 9½ feet below the shaft station floor of 1750 level. The Sutro tunnel connection with the Con. Virginia shaft is 10½ feet above the 1750 level sill floor. The board of directors reorganized after the adjournment of the stockholders' meeting as follows: C. H. Fish, president; N. T. Messer, vice president; A. W. Havens, secretary, and D. B. Lyman, superintendent.

The promoters of the Gold creek mines, Maj. J. L. Robertson and son of New York, H. J. Mayham and W. B. Duval of Denver, have returned from another trip of inspection near Elko. They have decided to inaugurate extensive development work at once. They have contracted for a large reservoir and dam. The reservoir will have a capacity when finished of 3,000,000 gallons of water. This will put the property in shape for the immediate production of gold as soon as the weather permits in the spring.

Pioche *Record*: In his claim south of the Deer Lodge camp, on the Nevada side of the line, J. Delmue is reported to have cut in his tunnel a 4-foot vein of high grade silver-bearing ore.

De Lamar *Lode*: It was reported on the streets during the week that the De Lamar property is being placed on the London and Paris markets. The system under which the stock is to be floated is known as the Barnato system, named after a Transvaal mining operator, and in this manner all of the stock will be worked off privately.

Reno *Gazette*: H. Miller has come in from Pyramid with two tons of ore from his mine. He expects to get good returns from it and thinks he has a very rich mine. He is down on the ledge about 10 feet and now has a ledge 2 feet wide in the bottom of his shaft, and it is growing wider every foot he sinks.

J. Raser is in from Grant creek with a sample of colmanite or borax in the form of a ledge. He found it about forty miles east of Grant creek and the ledge is about 2 feet wide.

Winnemucca *Silver State*: Two promising gold prospects have recently been discovered in the northern part of this county. One of them is situated on Big Wilder creek in Denio district. A 2-foot vein of rich free milling ore has been uncovered. L. L. Rickard and a prospector named Ward recently struck a gold ledge near Disaster Park which is the best prospect yet found in the district.

OREGON.

Baker City *Bedrock Democrat*: At the White Swan the owners are elated over the recent strike on the 400-foot level. A force of miners will be set to work at once drifting on the ledge both east and west, and another force will continue sinking until a depth of 500 feet is attained.

Democratic Times: Crow & Co. of Lost Flat, Josephine county, are taking out considerable rich ore, which it is estimated will yield $100 to the ton.

Twenty-seven tons of ore from the Oregon Bonanza mine, in Williams Creek district, crushed last week, yielded 215 ounces of gold, valued at $3000.

Capitalists and miners have been quite numerous in Grant's Pass lately, and the outlook is good for a season of exceptional activity in mining circles.

The Eccentric Mining Company, of Williams Creek district, last week had fifteen tons of ore milled, which yielded 39.36 ounces of gold, valued at $13.50 per ounce.

Several men are steadily employed at Beekman & Huffer's mine, near Jacksonville, and considerable good ore is being taken out.

Democratic News: The Mattern mine, in Ashland district, is being steadily developed, with flattering prospects.

A contract has been let for sinking a shaft on the west side of the Ashland mine.

The owners of the Black Republican mine, near Dodson's butte, Douglas county, have struck a large vein of ore, which is said to assay well in copper and gold.

F. Mattison and W. T. Nelson of Idaho have purchased a group of placer mines containing 100 acres in Kerbyville district.

BRITISH COLUMBIA.

Mail Creek *News*: Portland capitalists have purchased the Portland Oregonian, Exchequer and Multnomah mineral claims on Bear creek, and have incorporated them for $500,000.

Rossland *Miner*: The work of the past week on the Josie shows steady improvement in two places where development is being done. The drift from the main shaft has now broken squarely into the ore chute from which the principal shipments were made from the main tunnel. The drift has now a full face of solid ore.

The Montreal and British Columbia Prospecting and Promoting Company has taken up the bond on Gold Drop, in Greenwood camp. As soon as matters can be arranged a systematic development of the property will be commenced.

A strike is reported from Downie creek, forty miles from Revelstoke, of a ledge of iron oxide and galena. The ore assays in gold, silver and lead.

A Vancouver syndicate, represented by J. H. Hoar, has bonded the Ole Bull, Roseberry and C O D for $35,000, and is now working these claims. The same syndicate has secured a number of other properties on Barrett creek.

In Okanogan district the Anglo-American Mining & Milling Company of Rossland has taken a six months' bond on the Rainbow group of mines on Palmer mountain. The group consists of the Rainbow, Coyote and one or two others. A mill will be built at once, and the development will go on all winter. The ore is free-milling gold.

A Pittsburg, Pa., company has a bond on one of the iron cap properties near Loomiston, and will expend $10,000 or $15,000 in its development.

Spokesman-Review: F. P. Buck and others of Sherbrooke, P. Q., have purchased the Knob Hill mineral claim in the Greenwood camp, of the Boundary creek district. The consideration, it is understood, was $30,000. The claim is crown granted and adjoins the Old Ironsides.

Letters received from Rossland state that the bottom of the shaft of the Deer Park is in solid ore.

August Heinze has purchased an alternating dynamo capable of furnishing 100 lights of 16-candle power each, and an arc machine that will supply twenty-five lights. These arc lights will be used at the smelter to the number of eight or ten, and at the docks the railroad will have the use of three or four, while the remainder will be for the use of the city of Trail.

UTAH.

Salt Lake *Tribune*: A new strike of rich ore is reported in the Mercury.

The Old Fred, near the Sunshine, now lying idle, is to be worked again. There are bodies of low-grade ore developed.

W. G. Adamson and partners will resume the development of the Pacific group.

The Geyser in the next thirty days will be putting through 100 tons daily at its plant. There is a belief that it will begin the payment of dividends in December.

That the ore zone of the Tintic mines is as well defined at Silver City as at other points in the district is revealed in workings on the Shoebridge bonanza, where rich ore has been uncovered. The seam is not a big one, but it is rich and carries ore identical with that which was found in the Centennial-Eureka, the Mammoth and others.

From the Blue Bird, which is in the same diggings, comes a report that an ore body has been encountered at a depth of 225 feet, where there is found a high-grade silver-bearing rock that also shows some copper.

The Homestake has also discovered an ore body. Ore is now being hoisted for shipment.

At Tintic another new strike of high-grade ore is reported in the Sunbeam on the 250-foot level.

The Autumnal, at Park City, has begun shipping ore.

A conveyance from the Societe Anonyme des Mines de Lexington to the Conglomerate Mining Company, covering fifty acres of mining ground in West Jordan, has been placed on file. The consideration is 200,000 shares of stock of the Conglomerate Company. The conveyance also includes the Montana, third westerly extension of the Telegraph, No You Don't, Roman Empire, Nez Perces Chief, Mineral Zone and Key Note No. 2, together with an undivided half interest in a canal from the Jordan river.

Bingham *Bulletin*: Manager Wier of the new Henry M. outfit is in consultation with the owner, Mr. Newhouse, at Denver, and it is expected that plans will be adopted for the beginning of extensive operations in the near future.

The strike in the 300 level of the Winnamuck is reported to be opening up well.

IDAHO.

Avalanche: At the Trade Dollar the production continues steady. Over 125 men are upon the payroll.

At the Pauper connections have been made with the old shaft. Something like 200 feet of backs are now available.

At the Boonville the new mill is now almost complete.

Spokesman-Review: Every great mineral-bearing ledge in the Cœur d'Alenes has been traced and located for many miles in either direction from the places where mines have been opened up, with the single exception of the one on which the Bunker Hill and Sullivan is located. For years prospectors have hunted for that in the country between Wallace and the St. Joe river, some of them spending considerable money in their search. So many have hunted for it, and so extensive have been some of the endeavors, that it is estimated that no less than $50,000 in time and money has been vainly spent in trying to find where it crosses through the St. Joe mountains. It is claimed that S. D. Cole has made the discovery in a rich ledge on Slate creek.

Some rich placer ground has been discovered along one of the small tributary streams of the Clearwater, about fifteen miles from Kendrick. The gulch through which the stream runs has escaped the notice of prospectors.

Miners are leaving Kendrick every day for the Pierce camp to work on the numerous quartz claims that are being developed.

MONTANA.

Inter-Mountain: A 5-foot body of copper ore has been struck at the Iduna mine, in the Ground Squirrel district, upon which work was recently resumed.

The placer mines on Gold creek have all done well during the past summer, notwithstanding an unusually small supply of water.

The Lookout Mountain Company is doing extensive work on the mountain of that name. This company has thirteen locations.

The Gagnon is now producing about 350 tons of copper per day. The adjoining property, the Original, is producing about 50 tons. At the Original a new shaft house is being constructed and other improvements being made. When completed the electric line will be continued to the Original.

At the Keystone mine, in the Yakh district, a railroad has been constructed from Troy to the mine, a 10-stamp mill is now being erected and arrangements have been made to put in ten additional stamps at an early date.

At the Golden Scepter mill the machinery is all in place and, with the electric apparatus in operation, will be put in motion not later than Nov. 20. There is enough ore mined and in sight now to keep the mill in operation for eight months. The plant as it stands represents an outlay of about $750,000.

The news comes from Philipsburg that the Bimetallic properties at Granite will start up Nov. 5.

The great ore bodies of the Diamond Hill mine will be opened by tunnels at a depth of 500 feet and 3000 feet in length. The vein or zone is from 100 to 200 feet in width. The main or lower tunnel, which is directly behind the new plant, is being driven in on the vein and near the center of the ore body. Galleries will be run at every 200 feet, where ore chutes and stopes will be opened, from which the ore above will be drawn into cars and delivered direct to the ore bins in the mill.

SOUTH DAKOTA.

Black Hills *Times*: Supt. J. S. Grable, of the Union Hill Mining Company, has returned from New York, where he attended a meeting of the company's directors, at which the matter of erecting a stamp mill of large capacity was discussed and practically decided in favor of its erection on the Union Hill group of mines. The smelter and 10-stamp mill in Galena camp are running steadily on ores from the company's properties with satisfactory and profitable results.

The McKibbon tunnel, on Yellow creek, is now in 170 feet and has encountered the wall of the vertical ledge. It is estimated that in five or six feet more the ore will be struck.

The Gold Hill Development & Mining Company have commenced work on their group of claims situated in Garden City camp.

Development work on the old Silver Ridge group of claims situated east of the Ragged Top has been resumed by the owners, A. J. Smith and associates.

The National Mining Company have decided to resume work on their property situated on Sugar Loaf hill, southeast of the Ruby Bell. The shaft, now 203 feet deep, will be carried down to the ore contact, estimated to be 50 or 60 feet deeper.

A depth of 250 feet has been reached in the Snowstorm shaft on the Hawgood property. The bottom of the shaft is now in a soft mud shale, which indicates the close proximity of the ore contact.

The stamp mill of the Hawkeye Mill & Mining Company, at Pluma, has been started up again and will be kept in continuous operation day and night on ores from the company's mines.

The owners of the Kicking Horse group of claims, situated on the Blacktail divide, have encountered a fine shoot of ore in the west drift from the bottom of their 165-foot shaft. The shoot is four feet thick, and extends beyond both sides of the drift.

COLORADO.

Denver *Republican*: The Gold Coin strike has been the incentive for much active work in the Victor townsite. The discovery of a pay vein in the granite, unassociated with an eruptive dike, has been a great gain to this end of the district in giving mining men a new formation to exploit. A number of veins similar to, and running parallel with, the Gold Coin are known to course the camp site, and these are now coming into prominence. The Gold Coin shipped 20 carloads last week and is getting out from three to four cars a day. In the new working on the north ore chute, at 40 feet north from the 80-foot prospecting shaft, the ore is showing 42 inches wide and is not of the average quality.

Stoping has begun in the rich ore chute of the Bonanza King opened in the 300-foot drift from the Midget shaft. The chute has been developed for 100 feet in length, and carries a wide body of high-grade ore for the full distance.

The money has arrived from Baltimore to guarantee the success of the Cripple Creek and Gold Hill tunnel, negotiations for which have been under way for several months. Machinery ordered in advance will be put on at once and work pushed. The tunnel starts below the track of the Midland Terminal railroad on Gold Hill, and runs toward the Anchoria-Leland, which it cuts at 600 feet depth, in about 3000 feet length.

The Ross-Hurd tunnel into Gibbon hill has reached a length of 440 feet and is being driven steadily with air drills.

Production from the Tutt and Penrose lease on the Abe Lincoln in Poverty gulch for the past month was 200 tons, the ore averaging $75, and being shipped without sorting.

The Elkton is now shipping twelve cars a week of its several grades, ranging from $200 smelting to about $30 milling ore, and is holding the production at $40,000 a month. Arrangements are under way for putting in new pumps, which will allow sinking to be resumed and the level started at 400 feet to be run into the ore.

The New York syndicate, represented in camp by E. H. De Vore, has secured an extension for two months on its bond on the Katinka on Guyot hill, for which they are to pay J. S. Jones and others $46,500 when the option is taken up.

At Aspen nearly 100 miners have been laid off within the last few days. There are two causes. One is the low price of lead and silver and the other that a low grade of ore is being encountered in some of the properties, which, with the price of silver at anywhere near its proper figure, would yield handsome returns.

The story of gold having been discovered in the Independence Pass section last summer is now confirmed. Nothing will be done on the properties before next season.

Word comes from Chicago to Alma conveying the authentic information that the Troy Mining Company, owning the group of Mosquito district mines, comprising the Union, Brown, Orphan Boy Extension, Emma C., Little Nell, Alice, Union Placer claims, has sold a controlling interest to Chicago capitalists for $100,000.

In San Juan county the ore shipments from Silverton station average from twelve to fifteen cars daily, many of the cars carrying twenty tons.

E. C. Kelly has returned from Denver with the money necessary to run the first 500 feet of his tunnel and work is to commence at once.

The North Star is shipping eighty tons of ore per day, requiring the services of a team of 300 pack mules.

At Central City in the Corydon mine on Academy hill the east and west 700 levels are being extended with a 2½ and a 5 foot crevice in each. Daily shipments of ore taken from each of these levels average from twenty to twenty-five tons.

The shaft at the Gettysburg mine in Russell district is now down 400 feet, and stations are being cut, preparatory to commencing levels. There is about 6½ feet of crevice matter in the bottom of the shaft and shipments have been already made to the mills.

During September there were shipped from the Black Hawk depot 302 cars of mineral, representing the smelting ore and tailings shipped to smelters and elsewhere for the entire month. This is an increase of 102 cars or 1,656 tons over the shipments for the corresponding month of last year, also an increase of ninety cars over the previous month of August this year.

ARIZONA.

Journal-Miner: Another dividend of ten per cent has been declared by the receiver of the Little Jessie mine. This property is paying a large profit now, and new ore bodies are said to have been opened up recently.

The mining future of Jerome has a very bright look at present to those who take an interest in it. During the past four weeks three of the best companies in America have taken bonds on properties here, all of which call for development work to commence within sixty days.

The Lottie mine, on Big Bug, is developed to a depth of 500 feet and there is about 3 feet of ore at its deepest workings. The mill continues to run steadily.

Silver Belt: At the Black Copper group of claims development work has been temporarily suspended, to permit of the underground works being timbered. The mine has been sufficiently exploited to demonstrate its value. A one-fourth interest in the mines was recently sold to New York parties, who are refiners and dealers in copper, and Dr. J. M. Ford and Jas. A. Fleming of Phœnix, who bonded the property, are now in New York negotiating for the transfer of the other three-fourths to the same parties. Hoisting works will be purchased immediately, and shipped from the East, and the work of development will be vigorously pushed, and reduction works erected at an early date.

Prescott *Courier*: Word comes from Hassayampa district that a large body of ore has been struck in the Addie mine, which has been worked for several months past by Prof. Comstock, under bond. The ore carries copper gold and silver. About 700 feet of development work has already been done, mostly tunnel.

The Circulation

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCTOBER 13, 1896.

569,397.—COOKING STOVE—J. E. Armstrong, Santa Cruz, Cal.
569,272.—ORE CRUSHER—S. M. Briggs, S. F.
569,378.—WELL CASING SPEAR—E. M. Hoagland, Oakland, Cal.
569,458.—WINDMILL GEAR—W. C. Heffner, Prospect Park, Cal.
569,460.—CARBURETER—C. W. Ingraham, Heppner, Or.
569,284.—PRUNING TOOL—R. Jacks, Quincy, Cal.
569,207.—BOILER FURNACE—E. W. Jones, Portland, Or.
569,346.—CRANK HANDLE—J. D. McFarland, Jr., Prosper, Or.
569,509.—MUSIC CHART—F. Mueller, Spokane, Wash.
569,238.—WIRE ROPE CLIP—A. Painter, S. F.
569,303.—REAMER—J. Singer, Los Angeles, Cal.
569,361.—ORE FURNACE—C. E. Stockford, Sulphur Creek, Cal.
569,437.—HAY FORKS—J. F. Tuttle, Springdale, Or.
569,311.—CAR BRAKE—R. G. Woodward, Alameda, Cal.
569,312.—CAR BRAKE—R. G. Woodward, Alameda, Cal.
26,171.—DESIGN FOR BADGE—Whiting & Cather, Lebanon, Or.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

COOKING STOVE.—John E. Armstrong, Santa Cruz, Cal. No. 569,397. Dated October 13, 1896. The general object of this invention is to improve the cooking stove by improving the application of the heat to the oven and by providing for the equal application of the heat of the oven to the materials therein. The application of the heat to the oven is obtained by a peculiar construction of the firebox and the oven, the front wall of the latter forming the back of the former, and said wall having upon its firebox side a series of parallel projecting ribs or flanges forming passages which communicate with a passage below the oven, said passage passing under the oven and thence to the stovepipe. There is an ashpan under the firebox having a wall or partition which forms the front of the passage under the oven where said passage communicates with the spaces between the flanges or ribs. The equal application of the heat of the oven to the materials is obtained by the combination of a rotable plate within the oven, said plate being rotated automatically by means of a fanwheel in the stovepipe operated, as desired, by the escaping products of combustion. The materials to be cooked are placed upon this rotating plate and are thus subjected to an equal heat.

WELL-CASING SPEAR.—Ellery M. Hoagland, East Oakland, Cal. No. 569,378. Dated October 13, 1896. This invention belongs to the general class of well-boring tools, and especially the casing spears. The object of these spears is to take hold of and withdraw the casing. They consist of a stock which is let down within the casing by a suspending device, said stock being provided with gripping wedges or slips which by a wedging action when the stock is pulled up, engage or grip the interior of the surface of the casing and hold tighter the harder they are pulled upon so that the casing may be withdrawn. The object of the present invention is to provide a casing spear, the wedges of which may be readily initially adjusted to suit any sized casing, and which may be as easily released when it is necessary to take the spear out. This spear consists of a stock with inclined plane seats and slidable wedges or slips mounted thereon having elongated slots, a means tending to hold and force the wedges or slips upwardly, slidable locking pins engaging said wedges or slips and on which the latter have an independent vertical movement and devices in the stock for engaging the locking pins to hold and to release them.

CAR BRAKES.—R. G. Woodward, Alameda, Cal. Nos. 569,311 and 569,312. Dated October 13, 1896. This invention relates to improvements in car brakes which are especially adapted for use upon street railways and other cars of all descriptions. They consist essentially in the combination of brakes which are adapted to be applied to the wheels of the car, the shoe or shoes suspended above the rails, with suitable connections by which the shoe may be depressed and by frictional contact drawn backward in either direction, so that by this movement the shoe will act to apply the brakes to all the wheels. The vertically movable shoe is suspended above the track between the wheels of the car or truck, and a rocking shaft journaled across the truck frame is so connected with the shoe that the latter is depressed into contact with the track by the rocking of the bar; connections between the shoe and the brake beams act to move the latter and force the brakes against the wheels when the track brake is in operation.

ORE ROASTING FURNACE.—Charles E. Stockford, Sulphur Creek, Cal. No. 569,361. Dated October 13, 1896. This invention relates to a furnace for roasting ores, and is particularly designed for roasting quicksilver and similar ores. It consists of a shell or casing having central ore passages which are oppositely inclined and have vertically connecting throats between the bottom of each floor, and the upper end of the succeeding one, fireplaces in the casing, one upon each side of the ore passage having arches or openings leading inward, a passage or flue back of and beneath each floor, following the inclination thereof and of its vertical throat having a channel opening into the ore passage at the top of one floor and just above the lower end of the floor next above so that the heat acts directly on the ore passing alternately on to one floor and then over the ore and floor above. In conjunction with this is a means for charging the furnace, and a means for conveying away the hot air and fumes both from above and below the ore.

Commercial Paragraphs.

THE Risdon Iron Works have issued the tenth edition of their catalogue (No. 8) on the Bryan roller quartz mill. The Bryan mills have been in use on this coast for ten years and have gone far to show that old principles of milling are hard to excel. The new catalogue is an attractively arranged volume of fifty pages containing illustrations and data of considerable value.

THE Detroit Copper Company recently bought from the E. R. Allis Company at Denver, Col., one of the largest sized copper furnaces—42x60 inches—which is to be erected upon the company's property at Morenci, Ariz. This is the fourth large furnace that has been erected on the Detroit company's property. William Church of Denver is president of the company.

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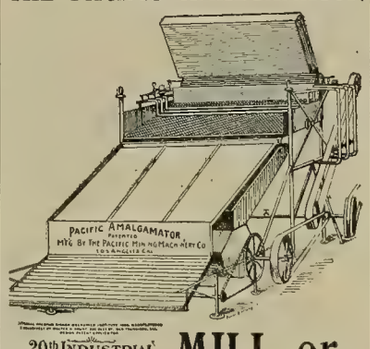

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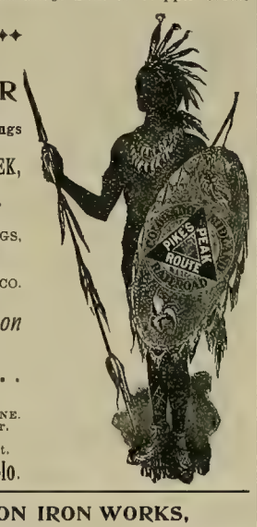

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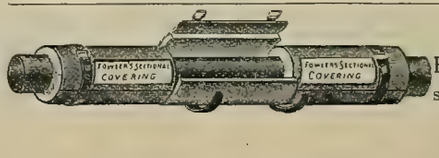

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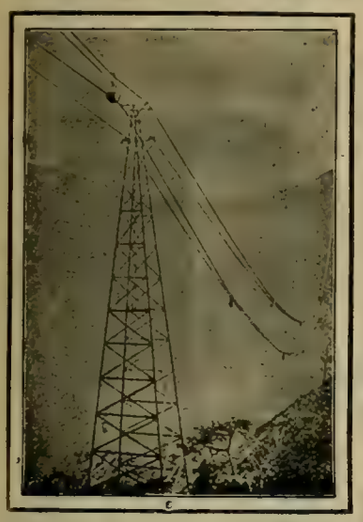

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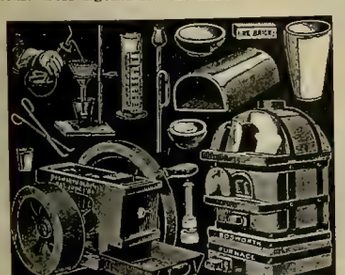

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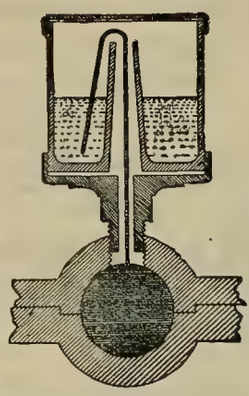
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Read One of the Many Testimonials:
UNION GAS ENGINE CO. SAN FRANCISCO, July 19, 1894.
During the past three years we have used your Cups for the crank shaft bearings of our engines, and also on all bearings of shaftings and tools in the shop. Our engines now *require no attention* except to fill the Cups occasionally, and therefore we can cheerfully recommend the Finch Cups to any one as *being the best in the market.*
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THE KENDALL PROCESS is the most efficient method of using cyanide for the extraction of precious metals from their ores. Wherever this process has been adopted the result has been increased percentages of values recovered and saving of time. Material reduction in consumption of chemical has also been demonstrated with respect to several classes of ores.
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The Kendall system of gold and silver milling comprises (1) the Extraction Process, in which the chemical solution extracts the values from ores; (2) the Recovery Process, by which the gold and silver are obtained from the solution, and (3) a modified form of plant, not indispensable, but permitting the use of unskilled labor.
Owners of mines and reduction works can obtain full information on application to
KENDALL GOLD AND SILVER EXTRACTION CO.....47 Broadway, New York City.

The General Gold Extracting Co., Ltd.,
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Patented in U. S. and Other Countries. Capital, £100,000.
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Laboratory and Ore Testing Plant, 1530 Wynkoop St., Denver, Colo.
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Adapted to all Heads from
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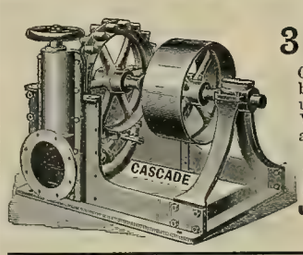

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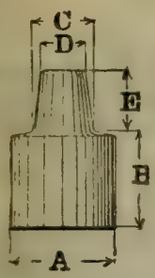

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We beg to call attention to our "RISDON HAMMERED" Shoes and Dies, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

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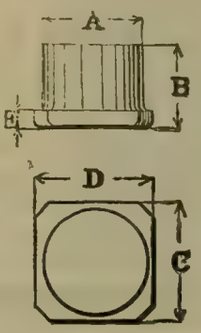

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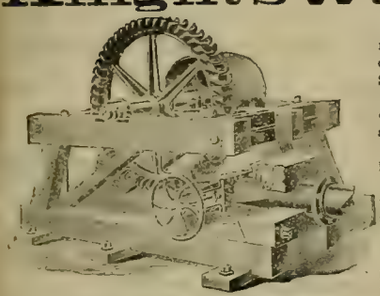

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The accompanying cut shows the general arrangement of Knight's Standard Water Wheel, of which there are hundreds in use in different States of the Union.

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Wheels inclosed in iron cases, from 6 to 24 inches.

Wheels for electrical power can be furnished with or without Governors. Highest regulation guaranteed.

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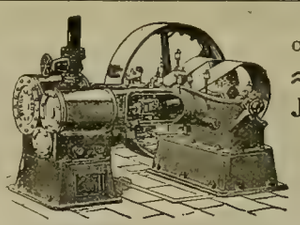

WRITE FOR CATALOGUE NO. 15.

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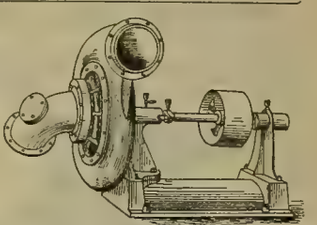

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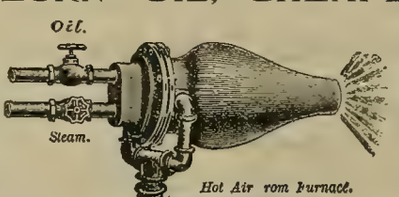

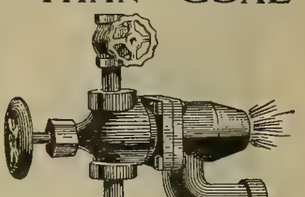

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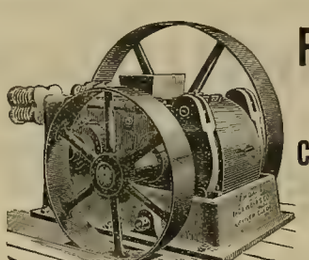

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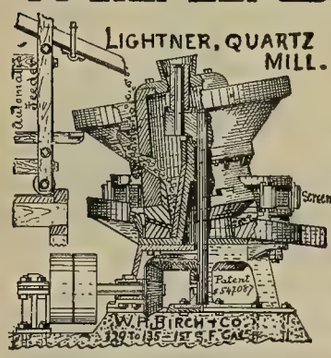

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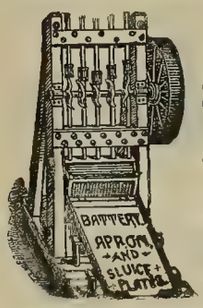

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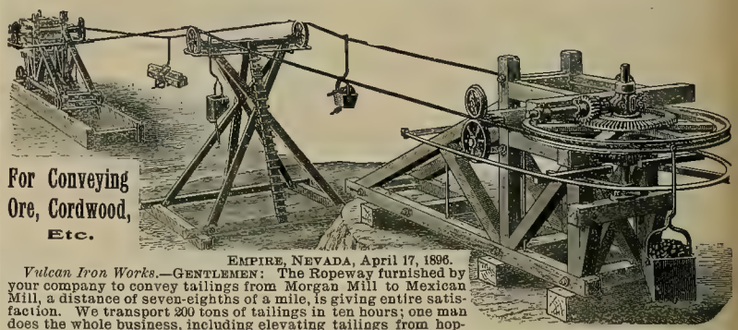
AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.



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AMALGAMATION AND CONCENTRATION PLANTS.

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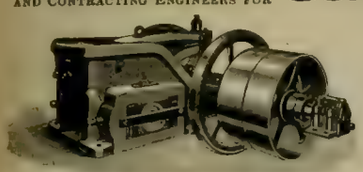

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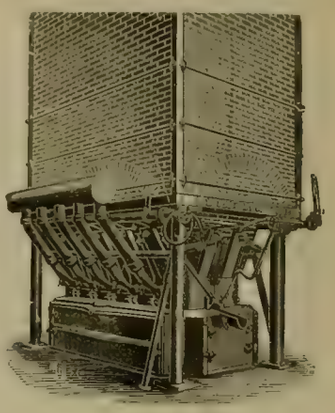
OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



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Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

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We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Moreing & Neal's Code and Bedford McNeill's Code.

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Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps, Compressors, Hoists, Boilers, Etc., Etc.

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Work the Best! Prices the Lowest!

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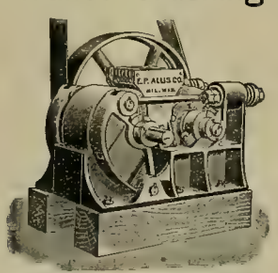

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SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

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SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

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Hoskins' Hydro-Carbon Assay Furnaces.

"Ferrite" and Projectile Steel Shoes and Dies.

Cheaper Than Cast Iron.

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Market Reports.

The Markets.

SAN FRANCISCO, Oct. 22, 1896.

Business is reported fairly active considering the exciting election. It is generally conceded that after the current month there will be a larger demand for goods than has ruled for many years. It is also the belief grounded on experience that the coming year will be exceptionally prosperous. This opinion is grounded on the fact that all farm products are bringing good prices, particularly grain, and when this occurs the purchasing power of the masses is increased. Besides this the hoarded gold will come out for investment the same as it did in 1880, which made that year unusually prosperous. The advance in our exportable products will swell the export values and enlarge, still more, the balance of trade in this country's favor which will draw increased quantities of gold to us. The Agricultural Department furnishes the following: "The value of our agricultural exports in 1892 was $799,328,000 and the value of exports of manufactures in that year was $158,510,000. The value of our agricultural exports in 1896 was $569,841,000 and the value of the exports of manufactures in that year was $228,480,000. Therefore, while the manufacturing exports increased $69,970,000 between 1892 and 1896, we lost $229,487,000 in agricultural exports." This current fiscal year will show a very large gain in the export value of farm products owing to the advance in market prices.

The local money market is practically unchanged. The withdrawal of gold from banks for hoarding is about over, leaving our banks in good financial condition. All legitimate wants from regular customers are freely met. It is quite generally conceded that after election several millions of dollars will come out for investment which will lower the rate of interest. In banking circles it is stated that a Swiss-Italian bank is to be established in this city. The Eastern money markets are again working easier with more gold coming from Europe. The call for funds to move crops has been exceptionally large, fully twice as much as had been estimated. In well-informed circles at the East it is stated that fully $200,000,000 in gold is being hoarded in this country. This will begin to come out for investment soon after election, which will make very active and prosperous times. The premium on gold was, at last advices, quite strong. In Europe the money markets are firm, with the rates of discount and premium on gold slightly higher, but notwithstanding this business is reported better than at this time in 1895.

New York Silver Prices.

NEW YORK, Oct. 22.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	30 1-16	65⅛
Saturday	30 1-16	65⅛
Monday	30⅛	65⅛
Tuesday	30⅛	65¼
Wednesday	30⅛	65⅛
Thursday	30 1-16	65⅛

	Copper.	Lead.	Iron.	Tin.
Friday	10 75	2 75	10 25@12 00	12 90
Saturday	10 75	2 75	10 25@12 00	12 85
Monday	10 70	2 75	10 25@12 00	12 80
Tuesday	10 70	2 75	10 25@12 00	12 75
Wednesday	10 70	2 70	10 25@12 00	12 75

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	Par
New York Telegraphic Transfer	05½
London Bankers' 60 days	$4.82½
London Merchants	$4.81½
London Sight Bankers	$4.85
Refined Silver, per oz., 1000 fine	64⅜
Mexican Dollars	50⅛@51½

SILVER.—The market has strengthened slightly at the East under a limited demand, which is indicative of stocks being well concentrated. It is the opinion in well-informed circles that there is liable to start in quite a bull movement at home and abroad, which may advance prices quite rapidly, owing to there being a large short interest. The production in this country is said to be less than in 1895, but then the legitimate demand has fallen away to a large extent. The steamer Belgic for the Orient took out $31,700 in bullion for Hongkong and $125,782 for Hiogo.

MEXICAN DOLLARS.—The market seems to be steadying up, with a slightly better demand ruling. The steamer Belgic took out 218,386 dollars for Hongkong.

COPPER.—The market is steady. Eastern mail advices state that there is a good export movement and an improving home demand. James Lewis & Son, Liverpool, report as follows on copper in their circular of October 1st: "The market has lacked animation during the past month, though it has remained firm, with moderate fluctuations in the value of good merchantable copper, which closes 13s 9d higher for cash and 17s 6d for three months' prompt, the advance on the latter having widened 3s 9d with the increased dearness of money. For refined copper there has lately been more inquiry, and manufacturers have taken a considerable quantity of American electrolytic at the low prices at which it was offered—this being the cheapest quality of copper obtainable—resulting in an advance of 10s per ton during the last few days. Much less copper is now offered for sale from the United States than was the case some time ago."

The market is quoted as follows:

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@16½

QUICKSILVER.—A good export and home demand is reported. The last steamer for Mexican ports took out 100 flasks.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

LEAD.—The markets at the East and on this coast are barely steady. Consumers do not appear to anticipate wants.

Our market is quoted as follows:

Pig	—	@	3 60
Bar	—	@	3 95
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is nothing new to report.

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

ANTIMONY.—The demand is fair, with the market steady at 7¾@8½c in a jobbing way. New York mail advices quote 7¼ for Cookson's, 6½c for Hallett's and 6⅝c for Japanese, from store.

BORAX.—The shipping demand is reported fairly active.

The market is quoted as follows:

Refined, in car lots	6⅛
Refined, in sacks	5⅞
Powdered, in car lots	5¼
Concentrated, "	5⅝

TIN.—For both pig and plate the demand is quiet. The market for the former is steadier owing to the better prices for silver.

Pig, per lb			13½
Plate, I C coke, heavy, per box	—	@	$4 05
" " " light, "	—	@	3 95

POWDER.—There is a continued free demand.

The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, " "	8½c

IRON.—The market is quiet but firm. An increasing consumption is looked for. Eastern markets are reported as follows by *Iron Age*: There is more animation in trade. Confidence is growing and has been stimulated by the advance in grain. This is checking the export movement in the cruder forms of iron and steel on account of the advance in freight rates. It is reported that German steel makers, alarmed by the inroads of American sellers of steel, have agreed to make a heavy reduction on competitive business. Chicago reports a heavy volume of business in local coke iron. Reports from Louisville indicate a large demand at the stove factories. Demand for Southern iron has fallen off at Cincinnati and there begins to be a feeling that the advance was not wholly warranted. Sales at Birmingham have been about sufficient to absorb the daily output.

Our market is quoted as follows:

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 0
Gartsherrie	21 50	23 0
Bolt	½ & 5-16, 20c; ⅜ and larger, 17c	
Lake Superior Sheathing		20

COAL.—There is nothing new to report in spot or cargoes in various positions. The consumptive demand is fair, with no stocking up. We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$7 50	@	8 00
Greta	6 00	@	6 50
Nanaimo	6 50	@	7 00
Gilman	5 50	@	6 00
Seattle	5 00	@	5 50
Coos Bay	—	@	4 50
Cannel	—	@	8 00
Egg, hard	—	@	11 50
Wellsend	—	@	7 00
Scotch Splint	—	@	7 00
Brymbo	—	@	7 00

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	—		—
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—The export movement continues large—fully 150 per cent more than at this time in 1895.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is unchanged. The demand is good.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, Oct. 22, 1896.

In last week's review of the mining share market mention was made of a sudden jump in prices for shares in the middle mines under the lead of Savage, Hale & Norcross and Challar. Friday morning the bears, having recovered from their fright, commenced a strong raid, sending prices down to nearly as low figures as ruled before the jump. It seems that the upmove was based on information which proved not to be entirely reliable; but it evidently served a good purpose, for many short sellers were forced to fill at a loss. The decline in the Pacific Exchange was so rapid they did not get out a large line of shorts, while in the San Francisco Board the market opened at very near the lowest prices of the day. Saturday, Monday and Tuesday the market was quiet and generally easy, but at the close of Tuesday a firmer tone developed which was more pronounced yesterday morning, with Con. Virginia showing the most strength, yet trading was light. In the afternoon the market was fairly steady, but still dull. The strength of Con. Virginia is said to be due to a continued improvement in the formation encountered in the work on the 1000-foot level near the Ophir line. Savage and Gould & Curry have shown some strength the past week on reports that the work on the Brunswick lode is of a more favorable character. There are miners who expect an ore strike in one, if not both, before long. The material encountered in the north drift on the Hale & Norcross 400-foot level has been quite favorable for a week or two past, but it may take some crosscutting before it can be determined as to ore. In Gould & Curry considerable work is being done. After all, nothing of more value may be found than has been discovered elsewhere, and, if so, end in disappointment to shareholders who look for big prices. So far as surface indications go, the writer does not feel warranted in saying that there are large moneyed men in the market ready for a good-sized deal, and until they come in it cannot be expected to go to high figures. Moneyed men will only come in when there is a genuine large ore development, for the days of big gambling on prospects, small strikes, etc., have gone by, for the moneyed public will not come in at high prices to help the game along except on dividend propositions, and these are not in evidence now but assessments are. While saying this it must be conceded that two or more small pools can at almost any time combine and promote a small upmove on reported strikes, and it is quite probable they will soon.

The news from the Comstock mines, which is essentially unchanged since last weeks' advices, reports active work in several with indications more favorable. At the north end the work in Utah is not of such a character as to attract attention. In both Union and Sierra Nevada it looks very much as if the aim is to do as much work as possible for the money expended without striking ore or anything else calculated to inspire confidence in outside operators. In Mexican the west crossdrift has entered better formation and it looks as if something more than assessments, if so desired, can be struck. Experienced miners are quite hopeful of good results, but for several years experienced miners, opinions have not "filled" only shorts have been compelled to do so after which then the usual low prices and bad reports. This does not apply to that mine alone for there are several to which the remarks are applicable. In Ophir they are still fooling in and around the central tunnel and also extending the west crossdrift on the 1000-foot level. How long it will take to get to the west lode seems, as yet, a conundrum. Perhaps this level when the work gets to be interesting and important may be abandoned until a more opportune time, as the 1450-foot level has been. In Con. Virginia, on the 1000-foot level, 50 feet south of the Ophir line, the formation and material encountered are said to be steadily improving. On the 1650-foot level another east crossdrift is being run. Ore continues to be raised from the 1750-foot level. The mill is running on ore. The joint Best & Belcher and Gould & Curry east crossdrift from the Bonner shaft is being pushed slowly ahead. In Savage active work is under way and, it is said, a good showing could be made if desired. In Hale & Norcross the work is essentially unchanged. In Challar a slight improvement is reported, but not of sufficient movement to attract attention. A few tons of ore is raised by Potosi as work in that mine is prosecuted. In Bullion and Alpha nothing new is reported. It seems as if they are as far off as ever from striking the ore found four or five years ago on an upper level. In Con. Imperial, Challenge and Confidence there is nothing new reported in official letters. From Yellow Jacket nothing is allowed to be made public. Some think the work in the mine is quite important. Belcher is raising ore sufficient to pay running expenses. The work in Crown Point is on several levels. It ought to attract attention before long. Instead of milling the ore taken out of Seg. Belcher the directors levied an assessment. From Overman and Alta there is nothing new to report in the official letters, not even the ore said to have been found in one of them some time ago.

On the Brunswick lode work is actively pushed in Gould & Curry, Savage, Hale & Norcross, Challar and Occidental. In none of these has anything been found which would attract attention if found on the Comstock lode, but it is the uncertainties and possibilities that make any mining proposition, and therefore the Brunswick lode mines are a decided gamble until more work has been done in them. Mining men of good judgment are quite hopeful that something of importance will be discovered yet. In Occidental work is continued on several levels. The advices are practically unchanged. In Challar they are at work on three levels—having taken up the Hale & Norcross 400-foot level south drift. If this drift is run to strike the downward continuation of the ore found above, more activity is looked for. A crossdrift is to be, or has been, started by Hale & Norcross on the 400-foot level. It is to be run for the downward continuation of the ore found above. The winze is still being sunk and when it reaches the 500-foot level work will be commenced to develop that level. In Savage and Gould & Curry the work is said to grow in interest. The shaft being sunk by Best & Belcher and Con. Virginia ought to be deep enough to open two levels in these mines.

From the Bodie mines, and also the Silver King, nothing of importance came to hand the past week. In Mono the Fortuna vein ore ought to be struck soon.

The following illustrates the changes of the week:

Mines.	Oct. 15.	Oct. 22.
Alpha	$ 13	$ 15
Alta Consolidated	.....	.....
Andes	28	29
Belcher	66	59
Best & Belcher	1 20	1 05
Bodie	52	.....
Bullion	23	.....
Challenge	46	47
Challar	2 70	2 35
Confidence	1 45	.....
Consolidated California and Virginia	2 00	1 90
Consolidated New York	.....	.....
Crown Point	57	.....
Exchequer	04	.....
Gould & Curry	94	82
Hale & Norcross	1 90	1 45
Justice	05	.....
Mexican	55	48
Ophir	1 50	.....
Overman	18	.....
Potosi	85	68
Savage	85	61
Sierra Nevada	74	.....
Union	61	60
Utah	10	16
Yellow Jacket	62	56

Frank H. Pettingell of Colorado Springs in his weekly letter says: "Regardless of numerous apologetic effusions to the contrary, the entire mining stock market is suffering intensely from many unforeseen influences of an exceedingly depressing character. This occasional passing of dividends has a very bad effect on everything relating to mining stock speculations. Of course, any one can say now they began to pay before the properties warranted it, which most companies ordinarily do. It would seem that money in the treasury of

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and	Sale.	Secretary.
Anchor Coal & Dev't Co, Wash.	7	3c	Aug 24	Sept 24	Oct 24	E D Farish, 632 Market
Bay State M & D Co, Cal	33	3c	Aug 21	Sept 30	Oct 20	F E Luty, 330 Pine
Central Eureka	3	2c	Sept 3	Oct 10	Nov 2	Wm A M Van Bokkelen, 320 Sansome
Challenge Con M Co	22	10c	Oct 14	Nov 17	Dec 8	C L McCoy, Mills Bldg
Channel Bend M Co	4	2c	Sept 14	Oct 16	Nov 7	J P Langhorne, 39 Sutter
De Soto G M Co	1	7c	Sept 7	Oct 10	Nov 9	E H Clark, Mills Bldg
Goleta M Co	4	20c	Sept 21	Nov 2	Dec 2	D M Kent, 330 Pine
Gould & Curry S M Co, Nev	79	15c	Sept 1	Oct 5	Oct 27	A K Durbrow, 309 Montgomery
Greenwood G M Co, Cal	1	2c	Oct 16	Nov 23	Dec 14	Chas E Elliott, 309 Montgomery
Justice M Co	61	5c	Oct 14	Nov 17	Dec 8	R E Kelly, 309 Montgomery
Mexican G & S M Co	55	20c	Oct 9	Nov 12	Dec 3	Chas E Elliott, Nevada Block
Minaret M & M Co	1	½c	Oct 9	Nov 15	Dec 1	Geo R Armstrong, 309 Montgomery
Montecito M Co	3	15c	Sept 21	Nov 2	Dec 2	D M Kent, 330 Pine
Occidental Con M Co, Nev	24	10c	Sept 2	Oct 8	Oct 29	A K Durbrow, 309 Montgomery
Potosi M Co, Nev	46	25c	Sept 28	Nov 4	Nov 24	Chas E Elliott, Nevada Block
Quaker G M Co	40	12c	Sept 7	Oct 8	Nov 5	C W Poindexter, 418-420 Market
Savage M Co	90	20c	Oct 2	Nov 4	Nov 24	E B Holmes, Nevada Block
Sterling M Co	3	15c	Sept 21	Nov 2	Dec 2	D M ent, 330 Pine
Sundum Chief M Co	1	15c	Sept 2	Oct 19	Nov 5	H G Stevenson, Hobart Bldg
Thorpe M Co, Cal	4	5c	Oct 14	Dec 12	Jan 9	A F Frey, 567 Market
Troy M & Dev Co	1	12½c	Sept 7	Oct 14	Nov 7	Otto Rust, 525 Front
Utah Con M Co	23	5c	Sept 10	Oct 13	Nov 2	A W Havens, Nevada Block
Yellow Jacket S M Co	61	25c	Sept 11	Oct 15	Nov 20	W H Blauvelt, Mills Bldg

THE SANTA ROSA GOLD MINING COMPANY.

Properties located in the Cripple Creek Gold Mining District.

We believe we can give you the largest prospective value for the least money.

Investigate carefully; hesitate before buying other stocks; consider SANTA ROSA and know why you don't want it.

Call, write or telegraph to F. H. PETTINGELL, 10-11 Bank Block, Colorado Springs, Colo.

Save Money on Your Supplies.

Having had twenty-five years' experience, a reliable man desires to act as Purchasing Agent for mine owners. Can effect a saving of 15 per cent on current market prices. Address "Purchasing Agent," care this office.

The Jno. G. Morgan Brokerage Company,

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STOCKS, BONDS, GRAIN AND PROVISIONS.

Direct private wires to Chicago, New York, Cripple Creek, Colorado Springs and Pueblo.

Orders executed in large or small amounts for cash or on *reasonable* margins. Out-of-town orders by mail, telephone or telegraph will receive prompt attention. Daily market circular mailed free on application.

a mining company was like a redhot coal, and that the ordinary board of directors are always devising some plan whereby they can get rid of it. It is better to disburse it in dividends than to dissipate it in handsome salaries for services never rendered, as some mining companies have frequently done. It is true, I have in mind the Isabella Company, one of the most flattering mining propositions in the entire Cripple Creek district, possibly somewhat highly capitalized; but still, taken as a whole, the possibilities of the Isabella Company are beyond comprehension.

"Taking things altogether, the market has the appearance of remaining stationary for several weeks to come. There may be occasionally an exception to this prediction, but there are few evidences of anything that will help matters. High-priced stocks seem to share as much in the general decline as the cheaper ones, and the close corporations not generally offered on the market are those which are showing the greatest intrinsic improvement. It is not a selling period, and those who will gradually study the situation and be guided by the physical condition of the property will make no mistake, but will make nice profits. There is too much of inclination to be swept along by some fictitious report emanating from an unscrupulous source, or to be carried away in some exciting manipulation which only suggests that something good has happened, when invariably nothing has occurred except in the imaginary mind of some stock exchange enthusiast."

San Francisco Stock Board Sales.

SAN FRANCISCO, October 22, 1896.

9:30 A. M. SESSION.

100 Andes		29	100 Savage		60
100 Best & Belcher	1	05	50 Union		60
200 Con Cal & Va	1	90	250 Utah		15
100 Gould & Curry		81	100 Yellow Jacket		54
200 Potosi		68			

SECOND SESSION—2:30 P. M.

200 Mexican		48	200 Alpha		15
100 Gould & Curry		82	200 Belcher		59
100 Con Cal & Va	1	85	300 Utah		16
200 Savage		61	150 Challenge		47
50 Chollar	2	35	100 Occidental		47
200 H. & N	1	45	500 Union		59
200 Yellow Jacket		56			

THE OVERLAND LIMITED, VIA UNION PACIFIC.

Only 3 1-2 Days to Chicago-----3 1-2.
Only 4 1-2 Days to New York---4 1-2.

The Union Pacific is the only line running Pullman double Drawing-Room sleepers and Dining Cars San Francisco to Chicago daily without change. Only one change to New York; dining car service entire distance. Vestibuled composite buffet smoking and library cars between Odgen and Chicago.

The only line running upholstered Pullman Tourist sleepers San Francisco to Chicago daily without change, and personally conducted excursions to St. Paul and Chicago without change, leaving San Francisco every Friday.

Tickets and sleeping-car reservations at No. 1 Montgomery St. Steamship tickets on sale to and from all points in Europe. D. W. HITCHCOCK, General Agent, San Francisco.

DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Cert.	No. Shares.	Amt.
E. C. Cain	170	2,500	50 00
E. C. Cain	171	2,500	50 00
C. L. Dingley, Jr	72	800	16 00
C. L. Dingley, Jr	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	169	3,800	76 00
E. C. Godfrey, Trustee	160	6,667	133 34
E. C. Godfrey, Trustee	166	1,333	26 64
E. C. Godfrey, Trustee	167	1,809	36 18
E. C. Godfrey, Trustee	141	1,667	33 34
E. C. Godfrey, Trustee	142	3,000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	83	2,000	40 00
J. F. R. Landis	138	1,000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6,000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2,500	50 00
Jos. A. Pratt	2	2,500	50 00
Jos. A. Pratt	3	2,500	50 00
Jos. A. Pratt	54	2,500	50 00
John E. Todd	5	2,500	50 00
John E. Todd	6	2,500	50 00
John E. Todd	9	2,500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until WEDNESDAY, October 21st, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California. E. C. GODFREY, Secretary.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until MONDAY, November 16th, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California. E. C. GODFREY, Secretary.

IMPROVED MINERS' LANTERN.

A light, simple, cheap and efficient Lantern, which will remain lighted in the strongest drafts. County or State rights for sale on royalty. MRS. HATTIE DELZELL, Jackson, Cal.

Assessment Notices.

CHALLENGE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. location of works, Gold Hill, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 16th day of October, 1896, an assessment (No. 22) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 35, third floor Mills building, corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of November, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on TUESDAY, the 8th day of December, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. McCOY, Secretary.

Office Room 35, third floor Mills building, corner Bush and Montgomery streets, San Francisco, California.

THORPE MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 14th day of October, 1896, an assessment (No. 4) of five (5c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 507 Market street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of January, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—No. 507 Market street, San Francisco, California.

GREENWOOD GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Greenwood, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 16th day of October, 1896, an assessment (No. 1) of two (2c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 79, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23rd day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 14th day of December, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. E. ELLIOT, Secretary.

Office—Room No. 79, Nevada Block, No. 309 Montgomery street, San Francisco, California.

GOLD RIDGE CONSOLIDATED MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 20th day of October, 1896, an assessment (No. 9) of two and one-half (2½c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 21st day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 14th day of December, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

WM. F. McLAUGHLIN, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from W. H. Allbright, in his mine near Placerville, El Dorado Co., to deposit tailings in a ravine below the mine; from W. P. Miller, in the Wild Cat Mine, near Montezuma Hill, Nevada Co., to deposit tailings in Blind Shady Creek; from John Freeman, in the Burlington Mine, near Logansville, Sierra Co., to deposit tailings in Nigger Creek; from Isaac Blomquist, in the Little Boulder Creek Mine, near Sierraville, Sierra Co., to deposit tailings in a ravine below the mine; from Hall & French, in their mine near French Corral, Nevada Co., to deposit tailings in an old pit; from Moulton & Eckman, in their mine near French Corral, Nevada Co., to deposit tailings in an old pit; from David Corbett, in the Linda Placer Mine, near Gibsonville, Sierra Co., to deposit tailings on a flat; and from James E. Roelke, in the Divide mine, near Kelsey, El Dorado Co., to deposit tailings in a ravine below the mine—gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on November 2, 1896, at 1:30 P. M.

FOR SALE.

Gold Mining Property,

Situated in the Silver Peak and Red Mountain Mining District, Esmeralda County, Nevada, the property of James O'Hale, deceased, comprising three claims well developed, mill site and spring, 2-stamp mill, engine (6 H. P.) and boiler, complete set of tanks and all requisites for cyanide process, mining tools, horse and wagon, two sets of harness, comfortable house—all to be sold as a going concern. Offers will be received by STAFFORD O'NEILL, postoffice address Silver Peak, Esmeralda County, Nevada.

A Position Wanted

By a Practical Mining and Mill Man, a party having had sixteen years of experience on the Comstock and fifteen years in California gold mining and milling and understands the practical mining and milling in every branch and detail. He is also a first-class accountant. The best of references given. No objection to going into foreign country, as the party speaks English, German, French, Spanish and Dutch.

Address "Practical Miner,"

Care of Mining and Scientific Press, S. F.

WANTED,

A position as Superintendent or Assistant Superintendent in copper-silver or silver-lead smelting works.

Understands mining, sampling, assaying, furnace management, handling men.

Prefer Mexico or Spanish South America. Speaks Spanish. Best references.

Address METALLURGIST, this office

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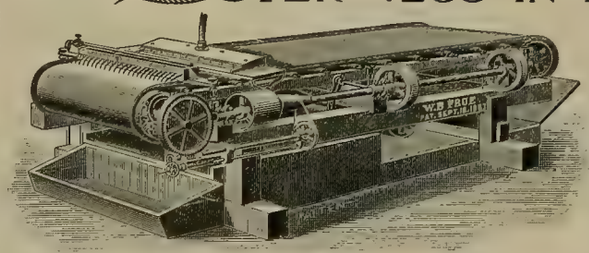

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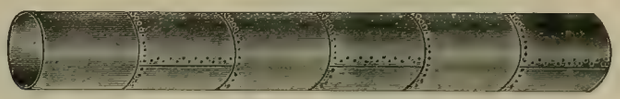

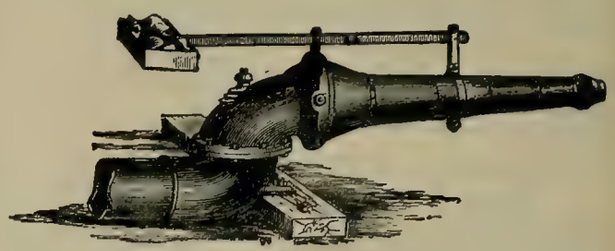

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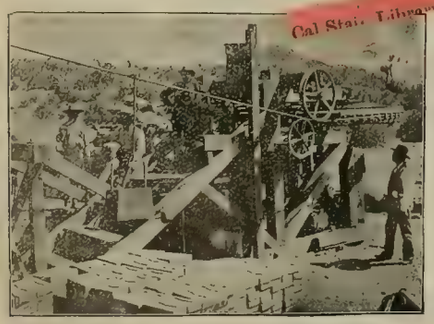

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AND PACIFIC ELECTRICAL REVIEW.

No. 1896.—VOLUME LXXIII. Number 19. SAN FRANCISCO, SATURDAY, NOVEMBER 7, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Transmission of Niagara Power to Buffalo.

The progress that has been made in the construction of the Niagara-Buffalo power transmission line is noticeable. Though not as long as some of our California electrical transmission projects, as for instance at Sacramento or Fresno, in this State, yet the commercial importance of the Eastern line is so great as to entitle it to notice. For nearly twenty-six miles this link of copper stretches across the country, and as there are three cables, or one three-phase system, the total length is nearly seventy-eight miles. The pole line ends about 300 feet north of Brace street, in the city of Buffalo, at which point the conduit work commences, and for the last 4200 feet the cables will be laid under ground. Work was begun August 14, 1896, and nearly 200 men started setting poles. In length the poles vary from 35 to 65 feet. They are of white cedar, shaved.

The illustration portrays the manner in which the conduit was constructed along the Bank of the Erie canal in Buffalo. The conduit is formed by twelve vitrified tile ducts, each 3 inches in diameter in the clear. They are laid in concrete, with 4 inches as the minimum protection on all sides. The depth of the conduit trench is about 40 inches. The average depth of the soil covering over the conduit is about 18 inches. In no place does the conduit approach the edge of the canal bank nearer than 14 feet, its inside line holding close to the 16-foot mark. There are sixteen manholes along the line of the conduit, their location being governed by the condition of the locality. These manholes are octagonal in form, with an interior of 5 feet. They have a brick wall of 12 inches, the bottom being formed by 6 inches of concrete and one layer of brick. In the construction of the conduit the surplus earth was loaded on to scows and carried out in the river and dumped. The terminal house will be of brick, with an interior of 16x9 feet and a height of 22 feet. From the last manhole of the conduit to the terminal house there will be a short tunnel about 4 feet long. The anchorages of the cables will be on the poles outside. The cable to be laid in the conduit will be lead-covered, guaranteed to stand a pressure of 20,000 volts. The first transmission, however, is to be at 10,000 volts. This lead cable will be carried upon a trestle inside the terminal house, where the ends will be sealed, and a rubber insulated wire without lead will be carried out as far as the first pole, the distance probably being about 20 feet, and there it will be connected with the bare copper cable of the pole line. The cable of the line is of 350,000 C. M. It is shipped on reels weighing about 2800 pounds and containing about half a mile of cable. In connecting the ends the inner core is removed and a half-connection made, which is soldered. In stringing the cables the reels are loaded on a cart having wheels 5 feet 4 inches and a tread of 3 inches. In this way the cable is run out, and the simple movement of a lever brings it up taut on the poles, which are set from 60 to 75 feet apart, the distance being varied to overcome the deflections of the spans. Complete transposition is effected every five miles, and at these five points on the line two poles, which are 5 feet higher than the adjacent poles, are placed.

In turning corners six poles and double crossarms are used in order to distribute the strain of the cable on six, instead of three, pins. The pinholes have a depth of 4 inches and all have drainage holes in them. The pins are boiled in linseed oil and their butts are painted. They are not nailed in position until after the double-petticoated insulators are screwed on. The upper crossarms are prepared for pins on which galvanized iron barbed wire will be strung at a height of about 18 inches to afford protection from lightning. These wires will be grounded at frequent intervals.

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TRANSMISSION OF NIAGARA POWER TO BUFFALO.—A SECTION OF THE CONDUIT IN BUFFALO.

The expectation is that Niagara power will be sent to Buffalo before the close of this month, but it is evident that the power company will not have any great amount of power to send to that city before the wheel-pit extension is finished.

For the past six months the newspapers published in the mining districts have been devoting less and less attention to mining as the election approached. In the meantime there has been a greater increase in the interest of the people in that industry than ever before. This has been going on, too, in spite of the fact that in all other industries capital has been "waiting until the election is over."

The Geological Survey and Mining.

The United States Geological Survey has, under the present regime, shown a commendable interest in the mining industry. This is only fair, for it is to mining more than anything else done by the hand of man that the geologist owes his knowledge of nature's secrets. For centuries, the world over, the deep mines have furnished him with the best data that he has obtained.

More than that, the necessity on the part of the miner for a knowledge of geology has more than anything else led to the present great interest taken in the subject by the public at large. But for the mining industry there would now be little need, from a practical point of view, for the United States Geological Survey; and but for the mining industry, it would not now receive at the hands of the Federal Government the liberal support it now has. But for the mining industry the great State Geological Surveys that have done, and are doing, much for science would not have been inaugurated.

It seems but fair, then, that some return should be made and that the work of the surveys should be so regulated, where practicable, as to be of use to the mining industry.

Director Walcott seems to appreciate this fact. Timely reports upon newly discovered mining districts were unknown a few years ago. Now it is to these places that he is sending his best men. Cripple Creek, Colorado, Mercur, Utah, the new districts in the Black Hills, the gold fields of Alaska and other districts have been visited. On some of them reports that are of value to the mining engineer, the investor and others have been published in time to be available. It has too often been the custom to send the geologists to old or worked out districts, and the reports, while valuable from a scientific point of view, have been of no practical use.

The intelligent conception of the value of the Survey's work to the mining industry on the part of Director Walcott gives promise that he would lend careful consideration to recommendations from representative bodies of mining men. There is work that can be done in this State that would be of value, and it seems to us that it is the province of the coming Miners' Convention to bring the matter to the attention of the director.

We publish in this issue an article written by Mark B. Kerr, in which he advocates that a good topographic and geologic map be made of the mother lode. There has never been any system or plan about the work that has been done in California, either by the State or by the United States Geological Survey. Now that the State Mineralogist proposes that a systematic survey be undertaken by the State, it is very important that the Federal Government should be asked to carry out its plan of a topographical survey and to base it upon such lines as would make it of value to the State survey. A thorough survey of the mining belts of California would be of great value at the present time, and for years to come, while so much prospecting is to be done.

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J. F. HALLORAN.....General Manager

San Francisco, November 7, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Transmission of Niagara Power to Buffalo—A Section of the Conduit in Buffalo, 373. Wm. McKinley, President-Elect of the United States, 379. General Interior Contour of Silver-Lead Blast Furnace, 380.

EDITORIAL.—Transmission of Niagara Power to Buffalo; "Waiting Until the Election Is Over;" The Geological Survey and Mining, 373. The Miners' Convention; Eminent Domain in Mining; Robbery of Ores from Mines and Reduction Works, 374.

MECHANICAL PROGRESS.—Interior Contour of Blast Furnaces; Gas Power on European Street Railways; Improvement in Marine Steam Engines and Boilers; Experiments with Compressed Air for Moving Street Cars, 380.

SCIENTIFIC PROGRESS.—The Earth as a Magnet; Scientific Joking, 380. A Thought-Weighing Machine; Lucium, 381.

ELECTRICAL PROGRESS.—Proposed Changes in Ocean Cables; Electric Industry in the United States; A Good Record, 381.

PRACTICAL INFORMATION.—Cleaning and Sharpening Files; Great Quantities of Machinery Used in Chile; British Guiana Rich in Mineral; Curious Method of Producing Platinum; The Automatic Machine Idea; Young Crocodiles; A Strange Idea, 381.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 382-3.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 384.

MISCELLANEOUS.—Concentrates, 375. Needed Mining Laws, 376-7-8. A Sun Dial; Geologic Surveys of the Gold Belt of California; Stamp Battery Development; Steal Other People's Inventions, 378. Electricity in Mining; The President-Elect; Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process, 379. Coast Industrial Notes; Personal; Recently Declared Mining Dividends; Recent California Mining Incorporations; Commercial Paragraphs, 384.

The Miners' Convention.

The California Miners' Convention will meet in this city on Tuesday next. No calling can bring together a better body of men than that of mining, and in no part of the world is the industry represented by larger-minded and more public-spirited citizens than in this State. They meet, not to ask something from the public, but simply to consider what they may best do themselves for their common good. To mining this State owes much, and the deliberations of the coming convention will be looked forward to with interest by all classes, for upon the welfare of the industry represented much depends to all.

Eminent Domain in Mining.

In addition to the proposed mining laws published in last week's issue, and which we republish in this issue because of the large demand for copies of them, we present a proposed amendment to the State Constitution declaring mining a "public use," to the end that the owner of a mining claim may maintain proceedings in condemnation in order to run tunnels and secure other necessary rights of way. The State Legislature has endeavored to give to the miner this right, but has been prevented by the Supreme Court, holding that mining is not a "public use."

In explanation of the proposed amendment, we have been furnished with the following data, which covers the ground very fully, by Mr. A. H. Ricketts of this city:

In the State of Nevada mining is declared to be a "public use" by legislative enactment and the decisions of the Supreme Court (Mining Co. v. Seawell, 11 Nev., 394; Mining Co. v. Corcoran, 15 Nev., 147), and the owner of one mining claim may maintain proceedings to condemn another mining claim, or a part thereof, if necessary to the working of the claim. In Douglass v. Byrnes (59 Fed. Rep., 29), it appears that the owner of a patented mining claim located a tunnel right, under the Federal mining laws, between the mouth of which and the said patented mining claim lay five different mining claims, of which three were patented and the other two held under a possessory title. It being necessary for the tunnel to pass through these five claims, the tunnel locator commenced condemnatory proceedings, and Judge Hawley, before whom the case was tried, held that as it appeared that the appropriation of the right of way through the said mining claims would be of great benefit and advantage to the mining district in which the claims were situated, and that it was necessary to condemn the lands asked for in the petition, which was the right of way for a tunnel 7½ feet wide by 7½ feet high, through said intervening claims, for the protection and advancement of said interests, and that the benefits arising therefrom were of paramount importance as compared with the individual loss, damage or inconvenience to the owners of such claims.

In the course of the opinion Judge Hawley says "a tunnel properly constructed through a mining claim cannot, as a general rule, be said to seriously interfere with the rights of the owner. Ordinarily, the running of such a tunnel would prove to be of great advantage and a benefit to the several mining claims through which it passes; and especially would this be so if proper provision could be made for the owners of such claims to have the use and occupancy thereof, in common with others, for the purpose of working their respective mines. But in any event it is difficult to see what particular objection can be urged to the running of the tunnel, if proper damages are assessed for the injury that may be caused to the mining claims through which it passes."

See, also, Bliss. v. Kingdom, 46 Cal., 652; Correa v. Frietas, 42 Cal., 339; compare Amador Q. M. Co. v. De Witt, 73 Cal., 482.

The Supreme Court of California construes the words "public use" to mean a use which concerns the whole community as distinguished from a particular individual or a particular number of individuals. Gilmer v. Lime Point, 18 Cal., 229.

In the case of Dower v. Richards (73 Cal., 477,) the Supreme Court held that no man can tunnel under part of a lot held under a townsite patent issued before the passage of the act of 1872, except by contract with the owner, as the use attempted to be obtained in tunneling the defendant's land was not a public use, and no valid State law authorizes it. But in the course of the opinion the court further said: "There was no valid law of State or United States existent which at the time of the issuance of the townsite patent prescribed any method of working a "gold mine" so situated. Therefore the title to the gold mine and its *locus* remained in the United States government, but that government not having legislated so as to impose any method of working said mine as a condition or restriction upon the fee simple holding of the part of the lot where there was no gold mine, owner of the lot held it absolutely, subject only to the right which might be given by a constitution or State law to condemn it for a public use."

Section 2328 of the Revised Statutes of the United States provides that "as a condition of sale, in the absence of necessary legislation by Congress, the local Legislature of any State or Territory may provide rules for working mines, involving easements, drainage, and other necessary means to their complete development, and those conditions shall be fully expressed in the patent."

On March 31, 1891, an act of the Legislature of California relating to the working, right of way, easement and drainage of mines in that State was approved. Section 2 of that act is as follows:

"All mining locations and mining claims shall be subject to a reservation of the right of way through or over any mining claims, ditches, roads, canals, cuts, tunnels and other easements for the purpose of working other mines: *Provided*, That any damage occasioned thereby shall be assessed and paid for in the manner provided by law for land taken for public use under the right of eminent domain."

With reference to a somewhat similar statute (act of April 1, 1870, Stats. 1869-70, 569), the Supreme Court of California in Bliss vs. Kingdom (46 Cal. 652) did not discuss the constitutionality of the act, but held that the "act of 1870 providing for the condemnation of the right of way over or through a mining claim for ditches, flumes, etc., necessary for the convenient working of another mining claim, is merely cumulative, and does not have the effect of excluding a party from the enforcement in court of the right to construct such tunnels, ditches, flumes, etc., when that right exists independent of the statute, as by local customs." See, also, Titcomb vs. Kirk, 51 Cal. 288; Correa vs. Frietas, 42 Cal. 339.

But in the more recent case of Amador Q. M. Co. vs. De Witt (73 Cal. 482) it appears that the defendant obtained a patent from the United States for his mining claim in May, 1882, which contained, among other things, the following condition of sale inserted in pursuance of Section 2338 Rev. Stats.: "That in the absence of necessary legislation by Congress, the Legislature of California may provide rules for working the mining claim or premises hereby granted, involving easements, drainage and other necessary means of its complete development." The plaintiff sought to condemn a right of way through a tunnel under defendant's mining claim. The court said there was and is no legislation by Congress providing for working mines, and none by the State except Section 1238 of the Code of Civil Procedure, and that its language could not be construed to be such a reservation as would justify an action to condemn a right of way through a tunnel under defendant's mining claim; that the mine of defendant is his private property, and it is clear that the plaintiff asks for the condemnation in order that it may appropriate a way through that property for its private use. This cannot be done. It was held in Con. Channel Co. vs. C. P. R. R. Co., 51 Cal. 269, that mining like the plaintiff's is a private industry and that private property cannot be condemned for such a use.

Therefore it would seem to follow that although Sec. 1238, Subdivision 5, C. C. P. (amended March 6, 1896, Stats. 1895, p. 66) is a legislative declaration that the construction of roads, tunnels, ditches, flumes, pipes and dumping places for working mines; also outlets, natural or otherwise, for the flow, deposit or conduct of tailings or refuse from their several mines are public uses in which the right of eminent domain may be exercised, still the doctrine that the judgment of the Legislature upon such questions is held not to be conclusive in California, and is open to review by the judicial department of the Government. In other words, it devolves upon the courts to determine whether or not the case is a public use. Santa Ana vs. Harlan, 99 Cal., 538.

And the Supreme Court has held that a right of way through a mining claim for the public use of another mine owner in working his mine cannot be the subject of the exercise of the right of eminent domain. Amador Q. M. Co. vs. Dewitt, 73 Cal., 482.

Neither can it be exercised so as to enable a person to build a flume on the land of another to carry off the tailings from his mine or to enable him to deposit tailings on such land. Con. Channel Co. vs. C. P. R. R. Co., 51 Cal., 269. Nor in favor of the owners of mining claims to enable them to obtain water for their own use in working such claims, though the intention may also be to supply water to others for mining purposes. Lorenz vs. Jacobs, 63 Cal., 71.

And where a railway was constructed and was operated exclusively in carrying coal from the mines belonging to the railroad company, no passenger or other cars being provided for the use of the public, it was held that the proceedings in condemnation of sufficient land for the purposes of the railway amounted to an imposition upon the court before which they were had, as the lands were sought to be taken for private use. People vs. Pittsburgh R. R. Co., 53 Cal., 694.

In Jacobs v. Day (111 Cal. 571) the court held that the use of water for the purpose of carrying off the tailings, and the construction of a ditch to aid therein, are essential to the successful conduct of hydraulic mining, and that the title to an adjoining mine passes under a patent from the United States, subject to the easement of this right of way for a ditch used in accordance with local mining customs, as a tail race from a hydraulic mine across the patented ground. But that decision, while it assumes certain rights in the hydraulic miner, did not involve the right of eminent domain but the question of the acquirement of a right of way by prescription and a construction of the Federal mining law.

It would therefore seem that in this State its Legislature gives to the miner a right which is denied him by the courts, because mining is not in their opinion a public use, and resort must therefore be had to a constitutional amendment to give effect to the legislative intent. And, to quote the apposite language of Judge Hawley: "The importance of encouraging the mining industry of this State must be kept in view. This was the object, intent and purpose of the Legislature in passing the act (Sec. 1238, C. C. P.), and its wisdom, policy and expediency were thereby determined."

Robbery of Ore From Mine and Reduction Works.

At the suggestion of several of the leading members of the California Miners' Association who have read the proposed mining laws published in the PRESS last Saturday a further bill is submitted, entitled "An act relating to the purchase of ores." The bill is intended to provide a means for the ascertainment of the robbery of ores from mines and reduction works by compelling the purchasers of ores to keep a record thereof, under a penalty therein provided, and is as follows:

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. That every person, association or corporation that shall be engaged in the business of milling, sampling, concentrating, reducing, shipping, or purchasing ores in the State of California shall keep and preserve a book in which shall be entered at the time of the delivery of each lot of ore:

First.—The name of the party on whose behalf such ore is delivered, as stated.

Second.—The name of the teamster, packer, or other persons actually delivering such ore, and the name of the owner of the team or pack train delivering such ore.

Third.—The weight or amount of every such lot of ore.

Fourth.—The name and location of the mine or claim from which it shall be stated that the same has been mined or procured.

Fifth.—The date of delivery of any and all lots or parcels of ore.

SEC. 2. Whenever affidavit shall have been made before any police judge of any town in this State, or any justice of the peace of any county, by any person, that ore has been stolen from him, stating as near as may be the amount and value of the ore stolen, such person upon presentation of a certified copy of such affidavit, shall have access to such book, and may examine the entries which may have been made therein during a period of fifteen days next preceding the filing of such affidavit: *Provided*, That the person making such affidavit shall, at the time of making the same, have a present interest in the product of the mine or claim from which said ore has been stolen, or in the ore alleged to have been stolen.

SEC. 3.—Every person, association, or corporation that shall fail or refuse to keep the book required by the terms of the first section of this act, or shall fail or refuse to make any proper entry therein, or who shall make any false entry therein, or who shall refuse to any person who may be entitled to the same, as provided by section two (2) of this act, the right of inspection thereof, shall forfeit and pay for each and every violation of the provisions of said section a penalty of not less than fifty (50) nor more than three hundred (300) dollars, to be collected at the suit of any person who may sue for the same. In addition to such penalty, any person, association or corporation violating the provisions of said first section, shall be liable at the suit of the party or persons aggrieved, in the proper form of action, for all damages which may accrue to any party or person by reason of such violation. And in all actions the fact that a false entry has been made shall be *prima facie* evidence that the same was made wilfully and knowingly.

SEC. 4. If any person, association, or corporation shall fail or neglect to make the inquiries necessary to the making of the proper entries in said book, as provided in section one (1) of this act, or shall so negligently make entries therein that any lot of ore cannot be particularly identified, or so negligently that it cannot be perceived therefrom what person delivered any lot of ore or received the proceeds of the same when purchased, or shall fail to keep such book, or shall wilfully suffer the same to be lost, or mislaid, so that the same cannot be produced for inspection, such failure or neglect shall not excuse any party defendant in any suit brought under the preceding section from judgment for any penalty prescribed by said section.

Concentrates.

ARIZONA'S mineral output in '95 was a little over $14,000,000.

THERE are about 500 people in the Mogollon district in New Mexico.

IT is proposed to erect a cyanide plant in the Randsburg district in Kern county.

OVER 600,000 ounces of gold were obtained by the cyanide process in the Rand in 1895.

OVER $15,000 in gold dust was shipped from Grant's Pass, Oregon, last month by one house.

A CONTRACT has been let for the erection of a 40-stamp mill in the Allen mine, in Amador county.

THE railroad company is attempting to patent land in Trinity county which is beyond question mineral.

SNOW in the Sierras already reaches as far down in the foothills as Shady Run, Placer county, Cal.

SAN FRANCISCO Mint coinage for the first nine months of '96 was $26,361,461; '95, $21,024,713; '94, $20,656,452.

WAGES in the Randsburg mining district in Kern county are $2.50 to $3 per day, but there is no want of men.

IN the recent political campaign Colorado and Montana each contributed $200,000 to the silver campaign fund, and Utah $100,000.

THERE are in the Butte, Montana, mining district 4000 patented claims, 3000 of which are silver and 1000 copper.

THE recent fall in silver was largely occasioned by the inability of speculators to carry what they had purchased with borrowed money.

THE next meeting of the California Debris Commission will be held at room 59, Flood Building, this city, at 1:30 P. M., on the 16th inst.

THE A. O. & M. C ny of onsville, Idaho, have received mint certificates for $225,000 worth of gold since last January.

ON a trip to the mines at Randsburg a visitor recently counted sixty-eight teams on the road from Mojave, all bound for the mines.

TO DO even a day's work in mining for gold or silver in British Columbia a man must pay a tax of $5, but there is no such charge for coal mining.

IT IS understood in Rossland, B. C., that a hitch has occurred in connection with the sale of the War Eagle. It is stated that the payment now almost due will not be made.

IN another week the newspapers will get through with their present task of explaining how it all happened and resume publication of news affecting interior development.

THE Union Gold Mining Company, of which Judge Williams is president and A. Harpending manager, has commenced the construction of a 20-stamp mill on its mine near El Dorado.

WELL, the nation has decided! Majorities rule, and now 'tis best for all to "get together" and work for the common good. We've had politics enough for a while; now for business.

THE manager of the Jackson Exploration and Development Company, in Amador county, has received cable instructions to sink the shaft in the Amador Queen to a depth of 1000 feet.

MANY of the items on this page every week are condensed answers to questions received at the office by mail, which are deemed of sufficient public interest to merit a concentrated reply.

THE Consolidated Deep Levels, Limited, of South Africa is a case of a mine that is not over-capitalized. It has lately declared a dividend of £60,000, or 30 per cent, which is the fourth paid.

THERE has been considerable increased excitement in Vancouver and Victoria, B. C., over mining, particularly over the reports from the Cayuse creek discoveries and those on Tascado island.

IT is claimed that in the new Deep Creek district in Utah, in which Standard Oil Co. people have lately made investments, there is ore enough blocked out to keep up a production of 200 to 300 tons a day.

THE last quarterly report of the Argentum-Juniata of Colorado, ending October 1, '96, shows a shipment of 105,971 ozs. of silver, with a value of $68,212.12, that left a net profit, after deducting all expenses, of $20,556.91.

THE suit brought by the Virtue Mining Company against George W. Grayson to obtain possession of the now rich Virtue mine in northeastern Oregon, has been decided in favor of the defendant by the Supreme Court of Oregon.

THE Government has let a contract for carrying the mail between Juneau and Circle City, Alaska. The distance is 898 miles and the contractors are to make four trips between November 1, 1896, and May 31, 1897, and will receive $1,700 for each.

ON Nov. 17th, 1859, snow began falling on the Comstock, Virginia City, Nevada, and continued for five days, attaining a depth of nearly five feet. It lay on the ground ninety days. That is the severest winter western Nevada residents remember.

SECRETARY OF THE INTERIOR FRANCIS has decided that California is entitled to indemnity selections for school lands returned as mineral by the surveyors, and that their field notes shall be taken as conclusive evidence that the land is mineral.

RICH coal deposits are reported to have been discovered in western Ontario, Canada, in the district of Algoma. Some Lehigh valley people have made an offer of $1,000,000 to the present owners if they will sell all their holdings in the whole district.

HUGH MCDONNELL AND JAMES SALEE, who were interested in the Iron Mountain mines of Shasta county until they were sold to the English company, have purchased for $50,000 the Compromise mine, near Tehachapi, and will begin to operate it immediately.

FROM the way unsolicited new subscriptions are coming in, it looks as though this would be the banner year for the increase in circulation of this paper. Nearly every old subscriber, in renewing for another year, takes occasion to write a kindly word for the paper, which is duly valued and appreciated.

THE Black Warrior Copper Company, recently organized in New York by James A. Flemming and J. M. Ford of Phoenix, Arizona, and W. H. Nichols and Mr. Langetrouth of New York, to erect reduction works on the Black Copper group at Globe, will commence work at once upon two large reverberatory furnaces.

A LARGE proportion of the mines of the Kootenay country are owned by corporations formed under the laws of Washington. But the other day a company was formed with its head office in Rossland, under the laws of British Columbia, which is registered in Washington, for the purpose of operating mines on this side of the line.

SOME of the leading mine operators at Leadville say that they have been approached by delegations representing the striking miners offering to declare the strike off, provided that no discrimination shall be made in hiring men, but have refused. As soon as the down-town companies shall have resumed, nearly all the mines closed by the strike will be again in operation.

REPORTS come from Ottawa, Canada, that William Ogilvey, who is in the Yukon district in connection with the delimitation of the Alaska boundary, has made a report to the Minister of the Interior, stating a great gold find has been made on the Bonanza creek, which flows into Deer river about forty miles from Fort Cudahy. Mr. Ogilvey said that 200 claims had been taken up and there is room for 1000 more. The department will send an officer to see that the claims are laid out properly, so as to avoid disputes.

THOSE who have not as yet done the required $100 worth of work or improvements on the unpatented claims held by them, for the twelve months ending midnight, Dec. 31, 1896, should bear in mind that but fifty-five days remain in which such work must be done, and that the law is mandatory on that point. It is also necessary that proof of such work be filed with the recorder.

THE term "lode" is in general preferable to the term "vein." A lode is more general than a vein, and there may be a number of veins in a lode, while a "vein" cannot contain a "lode." A lode includes everything between the hanging and foot walls, and, if even outside, there may be an impregnation of country rock of equal value to that in the fissure, that also is a part of the "lode."

AN engineer of the Mountain Mines Company of Shasta county has been over the ground to Humboldt Bay to gather data as to the feasibility of building a railroad from the company's mines. Numerous preliminary surveys for both rail and wagon roads have been made from this bay to the Trinity, Shasta and Tehama boundary lines, and the report has always been that entirely feasible routes offered in each instance.

THE report of the Alaska Treadwell Company for the month ending September 15, '96, shows a total yield of $59,391.27; expenditures, $27,127.40; profit, $32,263.80. From the mill in free gold $40,157 was obtained from 22,250 tons of ore, an average of $1.8048 per ton, and from the chlorination works $19,234.27, an average yield of $0.8645. The total average yield was $2.6693 per ton, the cost per ton $1.2192, and the profit per ton $1.4501.

MINING is attracting considerable attention to Lower California and the capital, Ensenada, is taking on the appearance of a mining center. Last week an expedition gotten up by Lacy Brothers of Los Angeles, consisting of twenty-five men and forty animals, left on the yacht Penelope, bound for San Francisquita, 350 miles south of Ensenada, near the silver mines of Cranz Brothers, where it is claimed rich discoveries have been made.

THE badge of the California Miners' Association for '96 represents Marshall at the moment of his discovery of gold in California. His right hand is outstretched and in the hand is held a golden nugget. The other hand rests on the pick that has brought to light the little piece of precious metal. The body of the badge is in white metal, while the nugget is of the golden hue. Below the figure of Marshall are the letters "C. M. A."—California Miners' Association.

THE 110 stamps at the Drum Lummon mine at Marysville, Montana, were all hung up last Saturday. A force of seventy-five men will be retained to prospect the mines and try to discover paying ore bodies. From the 600 to the 1600 level a barren zone was passed through, and now, in order that the ore body, if it exists at all, should not escape, they are driving a long level at the 1600 in that southerly direction in which the Montana ore bodies are known to dip.

PROSPECTING in British Columbia, Washington and Idaho is about over for the season and prospectors are coming into Spokane and other places, looking for winter quarters. The past season has witnessed great progress in the mining camps around Spokane. The principal work has been done in the north, although all around to the east, south and west the hills and mountains have been tramped over by the hardy prospectors and many promising prospects located.

THE oil well that was being sunk in the San Timotee hills in Riverside county, reached a depth of 475 feet, when the apparatus got stuck and the enterprise was abandoned. It has not been demonstrated that there is any great quantity of oil in the hills, but it has shown conclusively that there is a great amount of water—far more than any person expected would be developed—and that discovery may prove more valuable than would have been a moderate development of petroleum.

THE mill upon the old San Jose property in Egan Canyon, White Pine district, Nevada, has again been started up. Under former owners this property produced a great amount of bullion, but was closed down about fifteen years ago. Not long since the stock was purchased by John Heimrich and others of the Mercur Mining Company for $30,000, and a new corporation—the North Mountain Mining Company—was formed. It is claimed that there are large quantities of ore that will, with improved methods of working, pay well. This is an old story that is being happily retold in many a mining camp all over the Pacific Coast.

A CORRESPONDENT writing from Mercur, Utah, to the Salt Lake *Tribune* says: "To those who have never visited the district it is almost impossible to form an idea of the vast wealth contained in the hills. It has been demonstrated that the ore underlies the whole country from the Northern Light to Sunshine, a distance of eight miles, and from the East Golden Gate to the western foothills, a distance of about four miles. Putting the average depth of the vein at 10 feet—a very low estimate, by the way—and you have thirty-two square miles of gold ore, 10 feet deep. Estimate the value of this mineral body at an average value of $5, and you will have some idea of the extent of the mineral body in Camp Floyd district."

IN South Africa the native laborer has little to say as to what his wages shall be, and he is not allowed to strike or form unions. When the supply runs short more natives are brought in from the wilds, and the rate of wages is kept down to that fixed by the mine owners. Not long since the association of mine owners agreed upon a reduction of wages all round. Then with the assistance of the Government a demonstration of armed police and volunteers along the mines was made to overawe any natives who made the reduction of wages an excuse for disturbance. The official reason for these military preparations was the need for precaution against a native riot. The Chamber of Mines drew the attention of the Government to such a possibility.

THE Presidential election of the 3d inst. called out all the political forces of the country. Nearly 13,000,000 votes were cast in the nation. Out of the electoral vote of 447, Wm. McKinley, of Ohio, has 280; W. J. Bryan, of Nebraska, 167. The popular vote also included Congressmen from the various States, which results in the election of a Republican majority. In California three Democratic and four Republican Congressmen are elected. In the Second Congressional district Grove L. Johnson, who is charged with having helped beat the Mineral Land bill in Congress last winter, was badly beaten by his Democratic opponent. California's electoral vote is in the victorious McKinley column. It is thought that the successful Republican candidate will have nearly one million plurality in the general total. Elsewhere will be found a portrait and brief biography of the man who will be the 25th President of the United States.

Needed Mining Laws.

The demand for last week's issue of this paper containing the following matter was so great that it has been deemed advisable to republish it for the use and convenience of the visiting delegates to the Miners' Convention.

We have in this State most inadequate and unsatisfactory laws in regard to the location and manner of recording mining claims and other matters affecting the mining interest. This is shown by the constant litigation over points that should long ago have been settled by a simple code. There has been very little legislation to supplement the Federal mining law, and we have had nothing to depend upon but the court decisions, which have been unsatisfactory, inadequate and often conflicting. Recognizing that with the growing importance of the mining industry there is an increasing need for good laws to make more certain the rights of the locator, the mine owner, and the working miner, the MINING AND SCIENTIFIC PRESS has had prepared by the well-known mining attorney of this city, Mr. A. H. Ricketts, drafts of proposed bills to be submitted to the coming Miners' Convention for appropriate action.

These bills seem to us to cover the ground well, but we shall be very glad to receive criticisms and suggestions from miners and others interested in order that a good beginning may be made toward obtaining as perfect a code of mining law as possible. The bills as presented are made up from the mining laws of all the States and Territories.

We would refer our readers to an editorial in the issue of Oct. 31, where the essential points were more fully discussed.

Duties and Rights of Locators.

This bill as to how mines shall be located, the manner of recording mining claims, mill sites, tunnel rights, and as to annual assessment work and the rights of co-owners, is made up from the best provisions of the mining laws of different States and Territories, with new and additional provisions not found in any other laws as to mill site and tunnel right locations:

AN ACT RELATING TO THE LOCATION, RELOCATION, MANNER OF RECORDING LODE AND PLACER CLAIMS, MILL SITES, TUNNEL RIGHTS, AMOUNT OF WORK NECESSARY TO HOLD POSSESSION OF MINING CLAIMS AND THE RIGHTS OF CO-OWNERS THEREIN.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Any person, a citizen of the United States, or one who has declared his intention to become such, who discovers a vein or lode may locate a claim upon such vein or lode by defining the boundaries of the claim in the manner hereinafter described, and by posting a notice of such location at the point of discovery, which notice must contain: (1) the name of the lode or claim; (2) the name of the locator or locators; (3) the date of the location; (4) the number of linear feet claimed in length along the course of the vein, each way from the point of discovery, with the width on each side of the center of the vein, and the general course of the vein or lode as near as may be.

SEC. 2. Before the expiration of ninety days from the posting of such notice upon the claim the locator must sink a discovery shaft upon the claim located to the depth of at least 10 feet from the lowest part of the rim of such shaft at the surface, or deeper if necessary to show by such work a lode deposit of mineral in place. A cut, or crosscut, or tunnel which cuts the lode at a depth of 10 feet, or an open cut of at least 10 feet in length along the lode from the point where the lode may be in any manner discovered, is equivalent to a discovery shaft. The locator must define the boundaries of his claim by marking a tree or rock in place, or by setting a post or stone, one at each corner and one at the center of each side line. When a post is used it must be at least 4 inches square, by 4 feet 6 inches in length, set 1 foot in the ground, with a mound of stone or earth 4 feet in diameter by 2 feet in height around the post. When it is practically impossible on account of bedrock or precipitous ground to sink such posts, they may be placed in a pile of stones; or where the proper placing of such posts or monuments of stone is impracticable or dangerous to life or limb, it shall be lawful to place such post or monument of stone at the nearest point, properly marked to designate its right place. When a stone is used, not a rock in place, it must be at least 6 inches square and 18 inches in length, set two-thirds of its length in the ground, which trees, stakes or monuments must be so marked as to designate the corners of the claim located.

SEC. 3. Within ninety days of the date of posting the location notice upon the claim the locator shall record his claim in the office of the recorder of the county in which such claim is situated by a location certificate which must contain: (1) the name of the lode or vein; (2) the name of the locator or locators; (3) the date of location and such description of the location of said claim, with reference to some natural object or permanent monument, as will identify the claim; (4) the number of linear feet claimed in length along the course of the vein each way from the point of discovery, with a width on each side of the center of the vein, and the general course of the lode or vein as near as may be; (5) the dimensions and location of the discovery shaft, or its equivalent, sunk upon the claim; (6) the location and description of each corner, with the markings thereon. Any record of the location of a lode mining claim which shall not contain all the requirements named in this section shall be void. All records of lode or placer mining claims, mill sites or tunnel rights heretofore made by any recorder of any mining district or any county recorder are hereby declared to be valid and to have the same force and effect as records made in pursuance of the provisions of this act. And any such record, or a copy thereof, duly verified by a mining recorder or duly certified by a county recorder shall be *prima facie* evidence of the facts therein stated.

SEC. 4. The location or record of any vein or lode claim shall be construed to include all surface ground within the surface lines thereof, and all lodes and ledges throughout their entire depth, the top or apex of which lies inside of such lines extended downward, vertically, with all parts of such lodes or veins as continue to dip beyond the side lines of the claim, but shall not include any portion of such lodes, veins, or ledges beyond the end lines of the claim, or the end lines continued, whether by dip or otherwise, or beyond the side lines in any other manner than by the dip of the lode.

SEC. 5. If the top or apex of the lode in its longitudinal course extends beyond the exterior lines of the claim at any point on the surface, or as extended vertically downward, such lode may not be followed in its longitudinal course where it is intersected by the exterior lines.

SEC. 6. If at any time the locator of any mining claim heretofore or hereafter located, or his assigns, shall apprehend that his original certificate was defective, erroneous, or that the requirements of the law had not been complied with before filing; or shall be desirous of changing his surface boundaries or of taking in any part of an overlapping claim which has been abandoned; or in case the original certificate was made prior to the passage of this law, and he shall be desirous of securing the benefits of this act, such locator or his assigns may file an additional certificate, subject to the provisions of this act: *Provided*, That such relocation does not interfere with the existing rights of others at the time of such relocation, and no such relocation or the record thereof shall preclude the claimant or claimants from proving any such titles as he or they may have held under previous location.

SEC. 7. The relocation of abandoned lode claims shall be by sinking a new discovery shaft and fixing new boundaries in the same manner as if it were the location of a new claim; or the relocator may sink the original discovery shaft 10 feet deeper than it was at the time of abandonment, in which case the record must give the depth and dimensions of the original discovery shaft at the date of such relocation, and erect new or adopt the old boundaries, renewing the posts or monuments if removed or destroyed. In either case a new location stake shall be erected. In any case, whether the whole or part of an abandoned claim is taken the record may state that the whole or any part of the new location is located as abandoned property. If it is not known to the relocator that his location is on an abandoned claim, then the provisions of this section do not apply.

SEC. 8. Where a locator, or his assigns, has the boundaries and corners of his claim established by a United States deputy mineral surveyor, or a licensed surveyor of this State, and his claim connected with a corner of the public or minor surveys of an established initial point, and incorporates into the record of the claim the field notes of such survey, and attaches to and files with such location certificate a certificate of the surveyor, setting forth: (1) that said survey was actually made by him, giving the date thereof; (2) the name of the claim surveyed and the location thereof; (3) that the description incorporated in the declaratory statement is sufficient to identify. Such survey and certificate becomes a part of the record, and such record is *prima facie* evidence of the facts therein contained.

SEC. 9. The amount of work done or improvements made during each year to hold possession of a mining claim shall be that prescribed by the laws of the United States, to-wit: $100 annually. In estimating the worth of labor required to be performed upon any mining claim, to hold the same under the laws of the United States, the value of a day's labor is hereby fixed at the sum of $3: *Provided, however*, That in the sense of this statute eight hours of labor actually performed upon the mining claim shall constitute a day's labor. Where one person or company owns several contiguous claims capable of being advantageously worked together, one general system may be adopted to work such claims; and work done according to such system for the purpose of prospecting or working all such contiguous claims, although done on only one of such claims, or outside of all of them, shall be available to hold all such contiguous claims intended to be worked or prospected by such general system: *Provided*, That the expenditure of money or labor shall equal in value that which would be required on all the claims if they were separate or independent.

SEC. 10. Within sixty days after the performance of labor or making of improvements, required by law to be annually performed or made upon any mining claim, the person in whose behalf such labor was performed, or improvements made, or some one in his behalf shall make and record in the office of the county recorder in which such mining claim is situated, an affidavit setting forth the amount of money expended, or value of labor or improvements made, or both, the character of expenditures or labor or improvements, a description of the claim or part of the claim affected by such expenditures, or labor or improvements, for what year, and the name of the owner or claimant of said claim at whose expense the same was made or performed. Such affidavit, or a copy thereof, duly certified by the county recorder, shall be *prima facie* evidence of the performance of such labor or the making of such improvements, or both.

SEC. 11. Whenever a co-owner or co-owners shall give to a delinquent co-owner or co-owners the notice in writing or notice by publication provided for in Section 2324 Revised Statutes of the United States, an affidavit of the person giving such notice, stating the time, place, manner of service, and by whom and upon whom such service was made, shall be attached to a true copy of such notice, and such notice and affidavit must be recorded in the office of the county recorder of the county in which the mining claim is situated; within ninety days after the giving of such notice, or if such notice is given by publication in a newspaper, there shall be attached to a printed copy of such notice an affidavit of the printer or his foreman or principal clerk of such paper, stating the date of the first, last and each insertion of such notice therein, and when and where the newspaper was published during that time, and the name of such newspaper. Such affidavit and notice shall be recorded as aforesaid within one hundred and eighty days after the first publication thereof. The original of such notice and affidavits, or a duly certified copy of the record thereof, shall be evidence that the delinquent mentioned in said Section 2324 has failed or refused to contribute his proportion of the expenditure required by that section and of the service or publication of said notice: *Provided*, The writing or affidavit hereinafter provided for is not of record. If such delinquent shall, within the ninety days required by Section 2324 aforesaid, contribute to his co-owner or co-owners his proportion of such expenditures, such co-owner or co-owners shall sign and deliver to the delinquent or delinquents a writing, stating that the delinquent or delinquents by name, has within the time required by Section 2324 of the Revised Statutes of the United States contributed his share for the year....., upon the..... mine, and further stating therein the district, county and State where the same is situate and the book and page where the location notice is recorded; such writing shall be recorded in the office of the county recorder of said county. If such co-owner or co-owners shall fail to sign and deliver such writing to the delinquent or delinquents within twenty days after such contribution, the co-owner or co-owners so failing as aforesaid shall be liable to a penalty of one hundred dollars, to be recovered by any person for the use of the delinquent or delinquents in any court of competent jurisdiction. If such co-owner or co-owners fail to deliver such writing within said twenty days, then the delinquent, with two disinterested persons having personal knowledge of such contribution, may make affidavit, setting forth in what manner, the amount of, to whom and upon what mine, such contribution was made. Such affidavit, or a record thereof in the office of the county recorder of the county in which said mine is situate, shall be *prima facie* evidence of such contribution.

SEC. 12. No notice of location of a lode claim shall claim more than one location, whether the location be made by one or several persons. And if such notice purport to claim more than one location it shall be absolutely void, except as to the first location therein described. And if they are described together, or so that it cannot be told which location is first described, the notice of location shall be void as to all.

SEC. 13. The locator of a placer claim shall locate his claim in the following manner: 1. By posting a notice of location thereon containing the name of the claim, the name of the locator or locators, the date of location and the number of feet or acres claimed. 2. By marking the boundaries of his claim with a post, tree or rock in place, or by setting a post or stone, one at each angle of the claim located. When a post is used it must be at least 4 inches square by 4 feet 6 inches in length, set 1 foot in the ground, with a mound of stone or earth 4 feet in

diameter, by 2 feet in height around the post. Where it is practically impossible on account of bedrock or precipitous ground to sink such posts, they may be placed in a pile of stones. When a stone is used, not rock in place, it must be at least 6 inches square and 18 inches in length, set two-thirds of its length in the ground, which tree, stake or monument must be so marked as to designate the corner of the claim located: *Provided*, That if the United States survey has been extended over said land then the claim may be taken by legal subdivision, and no other monument, except that upon which the location notice is posted, shall be required than the United States corners.

SEC. 14. The locator of any placer claim shall, within sixty days from the date of the location of a placer claim, record such claim in the office of the recorder of the county in which such claim is situated, which record must contain: (1) the name of the claim, designating it as a placer claim; (2) the name of the locator or locators; (3) the date of such location; (4) the number of feet or acres thus claimed; (5) a description of the claim, with reference to some natural object or permanent monument as will identify the claim. Any record of the location of a placer mining claim which shall not contain all the requirements named in this section shall be void.

SEC. 15. The proprietor of a vein or lode claim or mine, or the owner of a quartz mill or reduction works not owning a mine in connection therewith, may locate non-mineral land not contiguous to a vein or lode, but no locations hereafter made of such non-adjacent land shall exceed five acres.

SEC. 16. The locator of a mill site location shall locate his claim by posting a notice of location thereon, which must contain: (1) the name of the locator or locators; (2) the name of the vein or lode claim, or mine, of which he is the proprietor, or the name of the quartz mill or reduction works of which he is the owner; (3) the date of the location; (4) the number of feet or acres claimed; (5) a description of the claim by such reference to a natural object or permanent monument as shall identify the claim or mill site. And by marking the boundaries of his claim in the same manner as provided in this act for the marking of the boundaries of a placer mining claim, so far as the same may be applicable thereto.

SEC. 16. The locator of a mill site claim or location shall within thirty days from the date of his location record his location in the office of the county recorder of the county in which such location is situated, by a location certificate which must be similar in all respects to the one posted on the location.

SEC. 18. Any record of a mill site location which shall not contain the name of the locator or locators, the name of the vein or lode claim or mine of which the locator is the proprietor, or the name of the quartz mill or reduction works of which the locator is the owner, the number of feet or acres claimed, and such description as shall identify the claim with reasonable certainty, shall be void.

SEC. 19. The locator of a tunnel right or location shall locate his tunnel right or location by posting a notice of location at the face or point of commencement of the tunnel which must contain: 1. The name of the locator or locators. 2. The date of the location. 3. The proposed course or direction of the tunnel. 4. The height and width thereof. 5. The position and character of the boundary monuments. 6. A description of the tunnel by such reference to a natural object or permanent monument as shall identify the claim or tunnel right.

SEC. 20. The boundary lines of the tunnel shall be established by stakes or monuments placed along such lines at an interval of not less than 300 feet from the face or point of commencent of the tunnel to the terminus of 3000 feet therefrom. The stakes or monuments shall be of the same size and character as those provided for lode or placer claims in this act.

SEC. 21. The locator of a tunnel right or location shall within sixty days from the date of the location record his location in the office of the county recorder of the county in which such location is situated, which must be similar in all respects to the one posted on the location. Any record of a tunnel right or location which shall not contain all the requirements named in this section shall be void.

SEC. 22. All blind lodes, or veins or lodes not previously known to exist, discovered in a tunnel run for the development of a vein or lode, or for the discovery of mines, and within 3000 feet from the face of such tunnel, shall be located upon the surface and held in like manner as other lode claims under the provisions of this act.

SEC. 23. The provisions of this act shall be construed as equally applicable to all classes of locations except where the requirement as to any one class is manifestly inapplicable to any other class or classes.

SEC. 24. All acts or parts of acts in conflict with this act are hereby repealed.

Punishment for Removing Mining Monuments.

This bill is one more particulariy intended to protect the location stakes and monuments of a mining claim. It is an amendment to Section 605 of the Penal Code of this State and the changes are indicated by the words printed in italics:

AN ACT TO AMEND SECTION SIX HUNDRED AND FIVE OF THE PENAL CODE OF THE STATE OF CALIFORNIA RELATING TO THE REMOVING, DEFACING OR ALTERING LANDMARKS:

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section six hundred and five of the penal code is hereby amended to read as follows:

Sec. 605. Every person who either:

(1) Maliciously removes any monument erected for the purpose of designating any point in the boundary of any lot or tract of land, *or defaces, removes, pulls down, injures or destroys any location stake, side post, corner post, landmark or monument or any other legal land boundary monument in this State, designating or intending to designate the location, boundary or name of any mining claim, lode or vein of mineral, mill site or tunnel right or location, or the name of the discoverer or locator or date of discovery or location thereof*, or a place where a subaqueous telegraph cable lies; or

(2) Maliciously defaces or alters the marks upon any such monument, *post or stake*; or

(3) Maliciously cuts down or removes, *injures or destroys* any tree upon which any such marks have been made for such purpose with intent to destroy such marks—

Is guilty of a misdemeanor.

Mine Robberies.

This bill is intended to amend an act concerning stealing from mines or mills. The changes are indicated by the words printed in italics:

AN ACT TO AMEND AN ACT ENTITLED "AN ACT SUPPLEMENTARY TO AN ACT ENTITLED 'AN ACT CONCERNING CRIMES AND PUNISHMENTS,'" PASSED APRIL 16, 1850, APPROVED MARCH 20, 1872.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. An act entitled "An act supplementary to an act entitled 'An act concerning crimes and punishments,'" passed April 16, 1850, approved March 20, 1872, is hereby amended to read as follows:

SECTION 1. Every person who shall feloniously steal, take, conceal, remove, or carry away from any *mine or* mining claim, tunnel, sluice, undercurrent, riffle box, sulphuret machine, *quartz mill, arrastra mill, chlorination or reduction works*, any gold dust, amalgam, quicksilver, or concentrates, *or the ore or mineral from any mine, ledge, lode, vein, or deposit*, the property of another, shall be deemed guilty of grand larceny, and upon conviction thereof shall be punished by imprisonment in the State Prison for any term of not less than one year nor more than fourteen years.

Mechanics' Lien Applied to Mines.

This bill is intended to amend the Mechanics' Lien law of this State in the interest of the working miner and to overcome the disadvantages he labors under through the Supreme Court's interpretation of the present law. The proposed changes are indicated by the words printed in italics:

AN ACT TO AMEND SECTION ONE THOUSAND ONE HUNDRED AND EIGHTY-THREE OF THE CODE OF CIVIL PROCEDURE OF THE STATE OF CALIFORNIA RELATING TO LIENS OF MECHANICS AND OTHERS UPON REAL PROPERTY.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section one thousand one hundred and eighty-three of the Code of Civil Procedure is hereby amended to read as follows:

SEC. 1183. Mechanics, material men, contractors, sub-contractors, artisans, architects, machinists, builders, miners, and all persons and laborers of every class performing labor upon or furnishing materials to be used in the construction, alteration, addition to, or repair, either in whole or in part, of any building, wharf, bridge, ditch, flume, aqueduct, reservoir site, canal, tunnel, fence, machinery, railroad, wagon road, or other structure, shall have a lien upon the property upon which they have bestowed labor or furnished materials, for the value of such labor done and materials furnished, whether at the instance of the owner or of any other person acting by his authority, or under him, as contractor or otherwise; *and any person who shall do work or furnish materials for the working or development of any mine, lode, mining claim, or deposit, or tunnel location yielding metals or minerals of any kind, or for the working or development of any such mine, lode, mining claim or deposit or tunnel location, in search of such metals or minerals; and all persons who shall do work or furnish materials upon any shaft, tunnel, incline, adit, drift or other excavation designed or used for the purpose of draining or working or developing any such mine, lode, mining claim or deposit, has a lien upon the same and the works owned and used by the owners for reducing the ore from any such mine, lode, mining claim or deposit; and all persons who shall do any work or furnish materials on or around or about any oil well or spring or petroleum field, either in building derricks, buildings, pipe line or any kind of machinery, or in boring or drilling, shall have a lien upon oil territory or petroleum field, whether designated as a placer claim or otherwise, upon which he labored or for which he furnished supplies, or the improvements thereon, whether the labor done or materials furnished were done or furnished at the instance of the owner of the building or other improvement, mine, lode, mining claim, deposit, or oil territory, or petroleum field, or his agent. And any person who shall do any work or furnish materials in or upon any mill site or structure thereon shall have a lien upon the same. And this chapter shall be so construed as to include in its provisions bridges, ditches, flumes, aqueducts to create hydraulic power works, reservoir sites, canals, lines or works or buildings for the generating, manufacturing or distributing of electric power for mining purposes, quartz mills, arrastra mills, concentrating or chlorination works, and all improvements in, on or about mines, lodes, mining claims, or deposits, or oil territory, or petroleum fields, or any mineral land whatever, whether or not such mines, lodes, mining claims, or deposits, or tunnel rights, or location, or oil territory or petroleum fields, be situated upon land classed or designated as mineral land or as non-mineral or agricultural land, or be held under an agricultural patent, or whether the title to such land is derived from the Mexican or Spanish Government;* and every contractor, sub-contractor, architect, builder, or other person having charge of any mining work of any character, or of the construction, alteration, addition to, or repair, either in whole or in part, of any building or other improvement, as aforesaid, shall be held to be the agent of the owner, for purposes of this chapter. In case of a contract for the work, between the reputed owner and his contractor, the lien shall extend to the entire contract price, and such contract shall operate as a lien in favor of all persons, except the contractor, to the extent of the whole contract price; and after all such liens are satisfied, then as a lien for any balance of the contract price in favor of the contractor. All such contracts shall be in writing when the amount agreed to be paid thereunder exceeds one thousand dollars and shall be subscribed by the parties thereto, and the said contract, or a memorandum thereof, setting forth the names of all the parties to the contract, a description of the property to be effected thereby, together with a statement of the general character of the work to be done, the total amount to be paid thereunder, and the amounts of all the partial payments, together with the times when such payments shall be due and payable, shall, before the work is commenced, be filed in the office of the county recorder of the county, or city and county, where the property is situated, who shall receive one dollar for such filing; otherwise they shall be wholly void, and no recovery shall be had thereon by either party thereto; and in such case, the labor done and materials furnished by all persons aforesaid, except the contractor, shall be deemed to have been done and furnished at the personal instance of the owner, and they shall have a lien for the value thereof.

What May Be Located as "Placers."

This bill is proposed for presentation to Congress to overcome the late ruling of the General Land Office in the case of Aldritt vs. N. P. R. R. Co., wherein it is held that only lands containing metalliferous ores not in place are subject to placer entry:

AN ACT TO AMEND SECTION TWO THOUSAND THREE HUNDRED AND TWENTY-NINE OF THE REVISED STATUTES RELATING TO PLACER CLAIMS.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled: That section two thousand three hundred and twenty-nine of the revised statutes be and the same is hereby amended as follows:

2329. Claims usually called "placers," including all forms of deposit of *metalliferous ores or earth*, excepting veins of quartz or other rock in place, *and including deposits of chalk, kaolin or fireclay, gypsum, petroleum oil, borax, carbonates and nitrates of soda, sulphur, alum, asphalt, limestone, mica, diamonds, or iron when not found in rock in place*, shall be subject to entry and patent under like circumstances and conditions, and upon similar proceedings, as are provided for vein or lode claims; but where the lands have been previously surveyed by the United States the entry in its exterior limits shall conform to the legal subdivision of the public lands.

Proposed Amendment to the Constitution as to Right of Eminent Domain.

The proposed amendment of Section 14 of Article I of the Constitution is taken bodily from the act of March 26, 1895, and is made necessary by the decisions of the Supreme Court of this State, that the Legislative declaration of public uses in which the right of eminent domain may be exercised is not conclusive in California and is open to review by the judicial department of the Government. The proposed amendment to the Constitution, if adopted, will insure the right to the miner and to others which the Legislature intends they shall have and

which, so far as the miner is concerned, is denied him by the Courts. The proposed amendment is contained in the sections numbered 1 to 13.

SENATE CONSTITUTIONAL AMENDMENT NO.—— TO PROPOSE TO THE PEOPLE OF THE STATE OF CALIFORNIA AN AMENDMENT TO THE CONSTITUTION OF THE STATE, AMENDING SECTION FOURTEEN OF ARTICLE ONE OF THE CONSTITUTION IN RELATION TO EMINENT DOMAIN.

Resolved by the Senate, the Assembly concurring:

That the Legislature of the State of California, at its regular session commencing on the 4th day of January, eighteen hundred and ninety-seven, two-thirds of all the members elected to each of the two houses voting in favor thereof, hereby propose that Section fourteen of Article one of the Constitution of the State of California be amended to read as follows:

SECTION 14. Private property shall not be taken or damaged for public use without just compensation having been first made to or paid unto the Court for the owner, and no right of way shall be appropriated for the use of any corporation other than municipal until full compensation therefor be first made in money or ascertained and paid into Court for the owner, irrespective of any benefit from any improvement proposed by such corporation, which compensation shall be ascertained by a jury, unless a jury be waived, as in other civil cases in a Court of record as shall be prescribed by law. This section shall be so construed as to include the following as public uses:

1. Fortifications, magazines, arsenals, navy yards, navy and army stations, lighthouses, range and beacon lights, coast surveys, and all other public uses authorized by the Government of the United States.

2. Public buildings and grounds for the use of the State.

3. Public buildings and grounds for the use of any county, incorporated city, or city and county, village, town or school districts; canals, aqueducts, reservoirs, tunnels, flumes, ditches or pipes for conducting or storing water for the use of the inhabitants of any county, incorporated city, or city and county, village, or town, or for draining any county, incorporated city, or city and county, village, or town; raising the banks of streams, removing obstructions therefrom and widening and deepening or straightening their channels; roads, streets and alleys, and all other public uses for the benefit of any county, incorporated city, or city and county, village, or town, or the inhabitants thereof, which may be authorized by the Legislature; but the mode of apportioning and collecting the costs of such improvements shall be such as may be provided in the statutes by which the same may be authorized.

4. Wharves, docks, piers, chutes, booms, ferries, bridges, toll-roads, by-roads, plank and turnpike roads; steam, electric and horse railroads; canals, ditches, dams, pondings, flumes, aqueducts and pipes for irrigation, public transportation, supplying mines and farming neighborhoods with water, and draining and reclaiming lands, and for floating logs and lumber on streams not navigable.

5. Roads, tunnels, ditches, flumes, pipes and dumping places for working mines; also outlets, natural or otherwise, for the flow, deposit or conduct of tailings or refuse matter from mines; also an occupancy in common by the owners or possessors of different mines of any place for the flow, deposit or conduct of tailings or refuse matter from their several mines.

6. By-roads leading from highways to residences, farms, mines, mills, factories, and buildings for operating machinery, or necessary to reach any property used for public purposes.

7. Telegraph lines.

8. Sewerage of any incorporated city, or city and county, or of any village or town, whether incorporated or unincorporated, or of any settlement consisting of not less than ten families, or of any public buildings belonging to the State, or to any college or university.

9. Roads for transportation by traction engines or locomotives.

10. Oil pipe-lines.

11. Roads for logging or lumbering purposes.

12. Canals, reservoirs, dams, ditches, flumes, aqueducts and pipes for supplying and storing water for the operation of machinery for the purpose of generating and transmitting electricity for the supplying of mines, quarries, railroads, tramways, mills, and factories with electrical power, and also for the supplying of electricity to light or heat mines, quarries, mills, factories, incorporated cities, cities and counties, villages, or towns, together with lands, buildings and all other improvements in or upon which to erect, install, place, use, or operate machinery for the purpose of generating and transmitting electricity for any of the purposes or uses above set forth.

13. Electric light lines.

A SUN DIAL made for London would be useless for either Paris or Edinburgh. The altitude of the pole star varies with the latitude, and hence is greater at Edinburgh, and less at Paris than at the polar star, the angle it makes with the dialplate must vary with the latitude.

Geologic Surveys of the Gold Belt of California.

Written for the MINING AND SCIENTIFIC PRESS by MARK B. KERR.

Every day and from many sources this inquiry is heard: "Why cannot detailed and reliable maps of the gold producing counties of California be obtained?" The folios recently published by the United States Geological Survey are very useful and valuable and are sold at a very reasonable rate to the general public.* But even these, although a great improvement over anything of the kind heretofore published, are not drawn on a scale sufficiently large to be of great economic value to the practical mining engineer when engaged in exploring and developing new areas and prospecting for gold-bearing veins.

The gold mining industry of California originally built up the prosperity of the State and stands today well in the lead of its resources. Prospecting in all the mining counties, and particularly in the "mother lode belt," is being vigorously and systematically pushed.

In thus opening up and prospecting new areas, a matter of primal importance is to obtain a good general topographic and geologic map. The county maps supply some information, the Geological Survey sheets a great deal more; but these are not sufficient for the growing needs of the progressive mining man.

If the Geological Survey would make their folios more detailed, the majority of those interested in mines would be willing, without doubt, to pay such a sum for the right kind of information as to warrant the cost to the Government of preparing them; and the sales made in this way could be credited upon the original appropriation in a much more important manner than the trifling sums at which the present maps are quoted at headquarters.

A thorough study of the "mother lode" would be of immense advantage at the present time, when so much prospecting is being done along its whole length. One area should not be preferred to another, but a good beginning must be made, and this lode today is decidedly more in evidence and is certainly of larger extent than most of the gold-bearing veins of the country.

A special and detailed map of this area, county by county, should be begun at once, and the delegates from Calaveras county have been instructed to bring the matter earnestly before the Mining Convention soon to assemble at San Francisco. When once this work is started, other parts of the gold belt can be taken up and material obtained of value to the miner.

The low-grade veins of the mother lode do not all come, by any means, to the surface. Shoots of ore are a mile and over apart, leaving valleys with no gold bearing veins between near the surface, but deep down. It is not unreasonable to suppose that as these shoots increase in width and length, in time they will join beneath the so-called barren valleys and eventually make continuous and profitable deep-level mines.

In the unexplored areas of Calaveras county, the largest portion of the lode is traversed by the Calaveras slates, forming approximately the hanging wall of the lode. The Mariposa or true black slates pertain to the upper Jurassic or lowest Cretaceous, and in this county form the foot-wall slates of the lode.

These slates once occupied the bottom of a vast and comparatively shallow sea, which extended to the base of the Plutonic mountains (now the Sierras). Gold was deposited in the quartz seams formed by evaporation in the fissures in these slates before and after upheaval. The plain or level of the top of these slate areas approximates at the present time the height of Jackson butte in Amador and Golden Gate hill in Calaveras, and can be stated at about 2000 feet above the sea. Gold also was deposited in the gravel channels flowing down from the old Plutonic mountains. A lava flow subsequently covered these gravel channels, extending to the edges and over the upraised slates. Erosion gradually lowered these ridges to their present position and height.

From this theory can be deduced an hypothesis that gold may be found in the mother lode veins as long as the black slates continue to go down. This has already been proved and exploited to be beyond 2000 feet. Assuming, therefore, the average past probable depth of the clays at the bottom of the old sea, and before upheaval to be about 2000 feet, a total depth of 4000 feet is reached, which may be roughly stated as the probable depth of the slates and gold-bearing quartz veins.

A geologic detailed study of this region, applied to practical mining development already done, would throw new light on these and many other important points, and its economic value is readily apparent.

A detailed topographic map on a large scale to accompany the geologic one in itself would be worth more than the cost of producing the whole work.

The Government in its economic work should not wait until a mining region is exhausted before making its definite reports, but should take up the new and undeveloped regions, and assist in exploring and making their value known to the outside public.

This matter, urged through proper representation at Washington, would go far towards obtaining sufficient appropriation for the work.

The Geological Survey from past experience, particularly in its report on the quicksilver deposits of the Pacific Slope, as well as work now actually being performed within the gold belt, is well equipped for such a study. If care is also taken to publish results with rapidity, the success of many prospects would be more safely assured, and a larger yearly output of gold would follow.

*Jackson folio and Smartsville folio sold by the U. S. G. S. at Washington for 25 cents.

Stamp Battery Development.

Is the stamp battery capable of further development? Apart from modifications of detail, there would seem only two directions in which development may be expected. The one is the better adaptation of the battery to dry crushing. The other is the introduction of variable adjustment, enabling one and the same battery to stamp any class of ore. In dry crushing by stamps one of the difficulties is that the discharge does not keep pace with the crushing. Unless there is instantaneous and thorough screening, the output is reduced; and, as the fines are ground still finer, while the larger pieces are in process of reduction, a perfectly uniform product is not obtained. Screening is sometimes accelerated by means of an exhaust, but attempts are now being made to supply intermittent blasts of compressed air, low down in the mortar, so as to get rid of the fines as quickly as they are formed. Unfortunately, none of these improvements can be effected without discounting a valuable advantage of the stamp battery—its simplicity.

As regards variable adjustment, or the capacity of altering at will the speed, drop and force of the blow, nothing, to the knowledge of the writer, has so far been done. No one set of stamps can at present deal in an equally efficient way with every class of ore. Batteries, therefore, range between the extreme slow stroke, long drop, light weight stamps, and those with heavy shoes, short drop, and rapid stroke. These variations are not arbitrary notions of manufacturers, but devices called into existence by actual requirements. For, though the object of crushing is one—namely, stripping the worthless gangue from the mineral, and, in most cases, the amalgamation of the latter, yet the method is necessarily manifold. One ore differs from another in its lithological, mineralogical, chemical and physical characteristics, and in consequence the most perfect separation and amalgamation demands battery work that may vary from slow crushing to rapid percussion. It is obvious that a friable, honey-combed quartz requires a different blow from a hard, tenacious rock. It will naturally be said that, when the ore at the mine is known, the stamp details can be suited to it, and no further adjustment is needed. But this does not apply to custom mills; nor does it strictly hold true of private mills. For the ore on any one mine is seldom constant; lodes change as the depth increases, fresh reefs are struck, etc., and the alteration in the mineral makes some change in the battery advisable, if perfect crushing is desired. The reply, of course, is that milling has to be not a theoretically but a commercially perfect process; and, if the speed drop, and blows are fairly well adapted to the ore, the acme of perfection is not worth the additional complication in the battery. This is a very reasonable and conclusive answer, so long as the inventor does not bring a satisfactory and practical retort in the form of a simple adjustable battery. Truly, it is not easy to see how this can be done. For practical reasons it is advisable to retain a division of the stamping units, as in the present gravity batteries. But the use of steam, pneumatic or hydraulic cylinders, with their accompanying valves, etc., for every stamp, would convert the battery into a complicated engine. Electricity furnishes apparently the easiest solution of the problem, as its application to the percussive rock drill is well understood, and could doubtless be utilized in an electric stamping battery, in which stroke, speed and impact would be easily capable of multiple adjustment. But, considering the rough conditions under which most batteries have to work, is the gain worth the complication introduced? Possibly not. Yet there is room for a crusher that shall have wider limitations than either stamps or rolls in the present form.—Capt. C. C. Longridge in the London Mining World.

Steal Other People's Inventions.

Just why inventive genius and gullibility should go together it is hard to say. Certain it is that inventors are the most guileless individuals in their dealings with others on business matters, and fall easy victims to the spiders who lie and wait for such flies. The list of clever men who walk to-day, while those who ride owe their luxury to the other man's genius and their own shrewdness, is an interesting

one. Here are a few cases picked haphazard from the chronicle of inventions that failed to benefit the inventor, or, at least, produced for him only a little of what was his due.

It is not necessary to be very old to remember when hooks were first put in men's shoes in place of holes, in order to save time in lacing the shoe at the top. This was the brilliant idea of an inventor to whom it should have brought a fortune. It would have done so had he been a shrewd business man. Being merely an inventor, he hadn't sense enough to keep his idea to himself until the patent office padlock had secured it against theft. In the innocence of his nature the inventor confided the idea to a friend while crossing the North river ferryboat, and the friend hardly waited for the boat to tie up in Jersey City before he excused himself, started back to New York, and went on a dead run for a patent lawyer in order to have the idea secured for his own especial benefit. Another man is known to-day as the inventor of the lace hooks. He owns a splendid house and is wealthy. The confiding inventor got nothing.

The inventor of a patent stopper for beer bottles, something that had long been wanted by the trade, sold the invention for $10,000 to a man who recognized its great money-making value. The purchaser is now worth $5,000,000, all of which he made from the sales of the patent stopper. Out of the goodness of his heart he presented the original owner of the patent with $30,000, so that the man got $40,000 in all for his $5,000,000 idea. To give some notion of the value of patent rights on this bottle stopper the price came down from $1 to 6 and 7 cents a gross, and even at this enormous reduction a good profit could be made.

The last inventor was treated with princely generosity, however, in comparison with a genius who devised a pocketbook clasp in the shape of interlocking horns, with balls at the end, which snapped shut with a single pressure. The idea was afterward applied to gloves and became very much in favor The inventor relinquished his prize for the magnificent reward of a kidney stew dinner and 50 cents, the latter having been advanced by the purchaser to pay the inventor's expenses from Newark to New York. The man who secured the idea and patented it, after treating the inventor in the royal manner mentioned, made a big fortune by his shrewdness. What became of the inventor is not known.

WILLIAM McKINLEY, PRESIDENT-ELECT OF THE UNITED STATES.

At a recent meeting of the Engineers' Club in Philadelphia, Mr. H. M. Chance described the application of electricity to the extraction of gold from the ores or materials with which it is associated. The processes described differ widely, both in method and principle, and were described as consisting of six classes, each involving a different principle or method of application. These classes are: (1) Electro-magnetic; (2) electro-solvent; (3) electro-amalgamating; (4) electro-precipitating; (5) electro-inductional; (6) electro-smelting. The first class employs electro-magnets to remove magnetic material from the gold with which it is associated or mixed. In the second class the current is used to assist in dissolving the gold from ores by means of chemical solvents of gold. In the third class the current is passed through the amalgamating plates or mercury to facilitate amalgamation. The processes of the fourth class are electrolytic, the gold being electrically deposited from its chemical solutions. These processes are extensively used in South Africa and to some extent in this country. The fifth method aims to remove gold particles from other materials by the inductive action of high-frequency alternating currents. The sixth method, that of electric smelting, promises well, provided the cost can be reduced to that of ordinary smelting processes.

The President-Elect.

William McKinley, President-elect of the United States, is a native citizen of Ohio, and is in his fifty-fourth year. His ancestry settled in America in 1724. Mr. McKinley's parents were plain folk, industrious and devout, and, while never in poverty, were so circumstanced that William—sixth in a family of nine sons and daughters—had to win his education by working out-of-hours and through vacation time. At seventeen he enlisted as a private soldier in the Twenty-third Ohio Volunteers, rising to second lieutenant and major. His war service was considerable and creditable. After the war he studied law, and in 1867 was admitted to the bar. He took an active part in local politics, and was chosen prosecuting attorney for the Canton, Ohio, district. In 1876 McKinley was elected to Congress, taking his seat in 1877. His recent political history as a Congressional leader, as chairman of the National Republican Convention of 1892, and as Governor of Ohio, is well known.

In 1871 Mr. McKinley was married to Miss Ida Sexton, daughter of a pioneer Ohio editor. Mrs. McKinley, who has for many years been an invalid, is said to be a woman of beautiful character and commands the absolute devotion of her husband. They have no children, a daughter born twenty years ago having died in early childhood.

Mr. McKinley has for many years been comparatively a poor man, having no income except his official salary and some small returns from legal practice. His savings from these sources, amounting to a few thousand dollars, were lost four years ago in a local bank failure. His style of living has always been of a modest kind. His home at Canton is a roomy but unpretentious cottage, and at Washington he has always lived at a hotel.

Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process.*

By H. Van F. Furman, Denver, Colo.

As the cyanide method for the extraction of gold from ores is extensively used in the United States and elsewhere, and appears destined to prove a factor of increasing importance in the metallurgy of gold, a description of the latest laboratory methods may prove of interest.

The history of the development of the process in the United States has been analogous to that of all new processes. Many failures are to be recorded and a few successes. It is the opinion of the writer that, had the following simple tests been better understood, many of the failures would not have occurred, and we should probably have a larger number of successful plants in operation. While the process is not simple, but requires a high degree of chemical and engineering skill, the determination of the adaptability of an ore to the method is generally not difficult. While the laboratory results will not always coincide with the actual results obtained in the mill, they will serve as a guide and control on the working of the mill, and will generally suffice to determine if the ore can be economically treated by the process. Objection may reasonably be made that in small tests conditions different from those which occur on a larger scale are introduced. However, tests made on from 25 to 100 pounds of ore should be closely duplicated in the mill. Tests on a smaller scale will serve to show what may be expected in the mill.

In determining the adaptability of an ore to this method of treatment, and the percentage of extraction which may be expected in the mill, the following must receive consideration:

The percentage of extraction will generally be somewhat higher in the laboratory than in the mill, but the consumption of cyanide will also be higher in the laboratory.

A most important point is the character of the ore, particularly the manner in which the gold is contained in it; whether it is in the free state; coarse or fine; intimately associated with pyrites or other sulphides; the character of the sulphides with which it is associated; whether it is combined or alloyed with bismuth, tellurium or other elements. An examination by the eye, with or without the aid of a magnifying glass, will frequently settle these points. Should the sample be in a finely pulverized condition, careful vanning may be resorted to with advantage.

The size to which it is advantageous to crush the ore will depend largely upon the character of the ore and its gangue. Should the gold be unevenly disseminated throughout the material, and the gangue be hard and non-porous, fine crushing is essential to a good extraction. The Cripple Creek ores are examples of such material, crushing to 40-mesh, or finer, being necessary to insure a good extraction of the gold. Some ores, however, being very porous, readily permit the solutions to percolate, and consequently can be successfully leached in a coarse condition. The Mercur ores are examples of such material, pieces one-half inch or more in diameter being successfully leached.

*Transactions Am. Inst. M. E., September, 1896.

(To Be Continued.)

Cripple Creek, Col., is said to have 9000 mining claims, just one-half of which are patented. This would represent nearly $500,000 of required assessment work in that one camp this year.

Mechanical Progress.

Interior Contour of Blast Furnaces.

The following is of practical value. Like the preceding article, "Hot Blast System for Copper-Matting and Silver-Lead Furnaces," which appeared on page 318 of the issue of Oct. 17th, it is from advance sheets of a catalogue of copper-matting and silver-lead smelting equipments to be published by the Colorado Iron Works Company, and now in press. It is written by Mr. John W. Nesmith, president of the company:

The diagram shown on this page is a graphic illustration of general interior contour of the silver-lead blast furnace now in general use, adaptable, by varying the proportions to suit the varying conditions involved, to all that general class of water jacketed rectangular furnaces for smelting ores for the recovery of their gold, silver, lead, copper, etc.

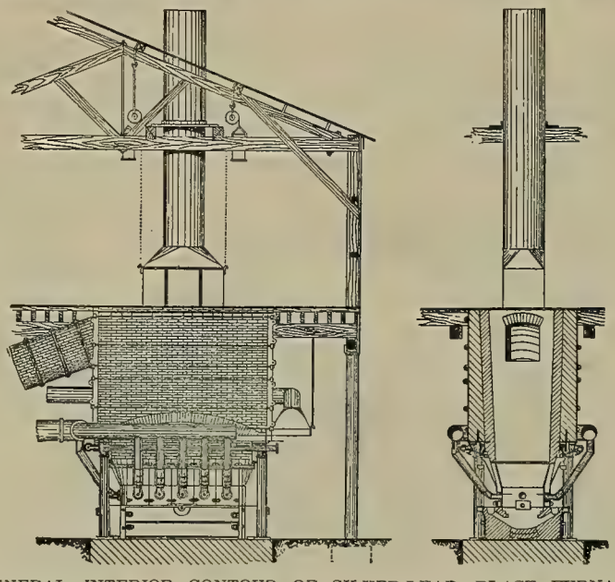
Much has been written and said about the adaptation of general interior contour to the conditions necessary for producing the end results desired, dividing the reactions in the material being smelted into the two general classes, oxidation and reduction. As a matter of fact, the general interior contour of a furnace adapted to produce these reactions is the same for both. It may vary in general proportions; it certainly does as to height, but as to the general trend of interior and wall lines the conditions are identical.

The reactions, whether reducing or oxidizing with carbon monoxide as the principal agent in the former, and oxygen in the latter case, take place to best advantage under similar conditions of temperature and exposure, and the boshed zone affords the best facilities for accomplishing either. With large proportional quantity of carbonaceous fuel burning in the melting zone and little or no free air passing through unconsumed, the atmosphere of the furnace becomes at once reducing as to certain conditions of the charge other than fuel, while with much excess of air blown into the melting zone and a proportionally small amount of CO being evolved, the characteristic of furnace reactions becomes more distinctively oxidizing as to the ore.

A straight furnace is simply a melting furnace, as a foundry cupola, and is adapted to melting pig iron or other product where a simple melting down of material without change in the groupings of its constituents is the object, while the duty of a smelting furnace is to produce such reactions as are necessary to change the grouping of the constituents of ore or other material operated upon, forming new combinations whereby the worthless is slagged away and the valuable concentrated; and as the evolved gases and oxygen are important factors in the smelting process, their distinctive reactions taking place to best advantage at temperatures ranging from dull red heat up to the final melting point of the material acted upon, and as time is a factor in the operation, more thorough exposure and time for their action than are afforded within straight walls are necessary to best results. Suitable proportions and characteristics of ore and fuel assumed in the charge, and volume and intensity of air blast into the hearth or tuyere zone determine the preponderance of the one or the other of these reactions, and it does not in the least interfere with or modify either the one or the other of them other than favorably if the furnace walls should be boshed outward at some point immediately above the melting zone; that is, at the incandescent zone where the preponderance of desired reaction of oxidation or reduction take place rapidly. Those reactions take place as well in a boshed zone as in a straight one, and by far better, in fact, for a given quantity of work done in a given time; that is, for a furnace of given duty, because boshing the furnace at the zone of incandescence next above the melting zone admits a proportionately greater quantity of ore in a given depth, or conversely a given quantity of ore for a greater length of time for exposure to the evolved gases or free air, or both, from the melting zone.

A copper furnace is a roaster to its top, and hence its efficiency in that regard, for all that part above the bosh is as the cross section area of that part to cross section area of hearth. For example: A hearth with cross section 10 feet by 3 = 30 square feet, and with 12-inch bosh of jacket section sides and ends area at top of bosh = 60 square feet. Thus double the amount of ore is constantly exposed to roasting action in all that part of the shaft between the top of bosh and top of shaft as would be exposed in a furnace with vertical walls, and has but to be supplied with the necessary oxygen to insure its proportionally increased efficiency, for in copper smelting the heat necessary to admit of the reaction is always there and escaping in the air. Boshing a furnace does not involve contraction of hearth. Proportion properly the hearth or tuyere zone section in its depth or height, its width, volume and pressure of air blast for the desired results, and they will be realized whether or not the walls are boshed above the melting zone, but more effectually if they are so boshed. At a melting temperature of say 2100° F. the air and evolved gases in the furnace have expanded to more than five times the original volume of the air supplied to the furnace by the blower. This with the blower pressure behind it, in a furnace with straight walls, causes a tremendous current upward to meet the ore in its rapid passage downward within the constricted limits of walls carried straight up from the hearth, allowing little time to any given piece or particle for exposure to the evolved gases or supplied air for their action upon it in their violent upward rush toward the top, which they quickly reach with small opportunity to have performed their appropriate functions in the reactions desired.

Of these intensely heated gases CO_2 is in considerable proportion where carbonaceous fuel is used, and so long as it carries sufficient heat to admit of the reaction is instant to give off an atom of its oxygen to glowing coke with which it comes in contact, evolving CO, which is ready again to burn on its first contact with oxygen in the presence of sufficient heat to admit of that reaction, and thus there is constant tendency to extension upward of the smelting zone. In a boshed furnace there is the opportunity for this immense volume of gases to expand laterally, and for equal volume a much less depth and wider area of ore is exposed for reactions and to take up their heat and decrease their velocity, and thus highest temperatures and their necessary reactions are kept proportionately lower down in the furnace.



GENERAL INTERIOR CONTOUR OF SILVER-LEAD BLAST FURNACE.

Straight walls afford an easy path for the gases with heat and flame to rush upward, carrying with them a great deal of dust and of the finest and lightest of the ores and calcines, while the heavier fine ores, as calcines, concentrates, etc., sift downward because the road is a straight one and because whatever coarse lumps of furnace material lie against the walls have greater proportional interstices around them on the wall side than such lumps of material have in the body of the furnace, where fines from all sides fall in and fill the vacancies. In a furnace having boshes these difficulties are much lessened or avoided altogether, for the bosh interposes a break in the open path which corrects the evils to a very great extent.

An important office of the bosh is its effect in keeping the furnace material freely open to permeation by the escaping gases. In a furnace with straight walls the whole weight of all furnace material rests on the bottom, sliding smoothly down with little friction as it melts away at the tuyeres, and the softened, half-melted mass at and near the tuyeres packs tightly, tending to obstruct the circulation of the air blast. In a furnace with boshed walls the boshes take the weight of that part outside of the vertical lines up from the hearth and hence cause friction on the column of ore within itself away from the walls directly above the hearth, reducing weight of ore column on the hearth and at the same time causing the ore to keep turning over and working within its mass, breaking up any aggregations of sintered material that may have formed above, and strongly counteracting the tendency there is to pack togeth r by reason of the fines filling all interstices and to become impermeable to the gases on their passage upward.

Whoever has operated lead furnaces having boshed sides and straight ends, and there are many of them, has noticed that the fire flames up the straight end walls much sooner and much more violently than up the boshed sides, and many metallurgists now insist on having the end walls as well as the sides built with bosh. And the angle of bosh has increased very much of late years, especially where there is much fines to smelt, some experienced furnace metallurgists requiring their water jacket sections made with 12 inches bosh in the. 30 inches next above the angle. Zinc crusts and other like accretions are as easily barred off a boshed section as off a straight one.

The bosh of a furnace is really thus an important factor in the smelting operation, and while it is possible to smelt ores in furnaces having no bosh, there are few cases where the bosh would not be an improvement, and it may fairly be said that such smelting is done in spite of the absence of that important factor, rather than better without it. The alleged smelting furnace having straight walls from hearth to tunnel hole, is on its way out and will directly be regarded as a relic of primitive methods.

In the case of iron furnaces gradual reduction of size from the upper part of the boshed section to the top is a logical conformation of proportions to the conditions, for the gases cool and contract in their course upward, giving off their heat to the body of ore in the stack and continuing to produce the appropriate reactions on their upward flow until a zone of dull red heat is reached and passed, above which point such reactions practically cease. In lead furnaces where it is essential to keep the velocity of escaping gases as low as possible, it may be the better practice to carry the walls up straight from the top of the boshed section, as is now the almost universal practice, in order that there shall be a continually proportional reducing velocity of the current of gases as it cools and contracts on its way out. There however is the disadvantage in this practice of always having a much greater quantity of ore and fuel in the furnace than there would be if the stack were reduced toward its top, so that when it is necessary to run down for any purpose or to change the proportions of charge in order to affect the running of the furnace, it takes a longer time to accomplish it proportionally as difference in area.

Gas Power on European Street Railways.

Gas street cars are being run this summer between Hirschberg, Warmbrunn and Hermsdorf, 8.4 miles; a line is to be run to connect Rudesheim with Biebrich, Wiesbaden, Cassel and Mayence, 27 miles; a line is in view for the suburban service of Hanover; a line at Colmar, probably; experiments are being made at Maestricht, Charlottenburg, Mannheim, St. Petersburg, Copenhagen, and will be made in eight other Continental towns. Paris is also experimenting on the Gas Traction Company's cars, with the following results: Horse power, 12 to 15; revolutions per minute, 100 to 250; volume of gas reservoirs, 44.2 cubic feet; initial pressure of gas, 10 atmospheres; volume stored, 442 cubic feet; water, 16½ gallons; number of passengers per car, 42; weight of car, empty, 7 tons; full, 10 tons; gas used per car mile, exclusive of gas used for compression, 31.1 cubic feet; maximum speed, 10 miles an hour; longest run without recharging, 14 miles. With gas at $1.13, this comes to 33 cents per mile run; and with establishment charges at $2\frac{7}{12}$ cents a mile and keep of cars at 2⅓ cents, this comes to 9 cents per car mile, as against 11¼ cents, the actual cost of electric car running in Paris.

THE improvement in marine steam engines and boilers is well shown by the following statement in the Liverpool *Journal of Commerce*: "Twenty-four years ago a firm of shipowners had a steamer built to carry 3200 tons dead weight. They have had one built this year to carry 8000 tons; and the coal consumption of the two vessels at the same speed is practically identical, though the latter vessel is 100 feet longer than the older one, but the fall in the rate of freights has been more rapid still.

A FEW experiments were made in this country and in France several years ago with compressed air for moving street cars. The idea was soon given up here, but it is in use in one or two cities abroad. For the past five weeks three cars equipped with suitable apparatus have been on trial on a short cross line in New York city.

Scientific Progress.

The Earth as a Magnet.

Dr. J. A. Fleming, F. R. S., in a lecture at Liverpool during the meeting of the British Association for the Advancement of Science on "The Earth as a Magnet," said that Columbus on his first voyage to America had made observations which showed that the declination of the needle is different at different places, and that there is in general a variation of the needle. Columbus appears to have crossed in this voyage the line of no variation on which the needle takes a true north and south direction. Burroughs' exact measurement of the variation in England in 1850, however, gave a starting point for the knowledge that the declination not only varies from place to place, but varies at the same place from year to year. The lecturer then pointed out by means of a number of charts and working models the general distribution of terrestrial magnetism. There are two poles of verticity, one in each hemisphere, where the dip needle stands vertical. These were closely attained by Sir James Ross in voyages to the Arctic region in 1831, and Antarctic regions in subsequent years. In addition to this there are in the northern hemisphere two places of maximum magnetic force called foci; and at least one, and perhaps two, foci in the southern hemisphere. This irregular distribution of magnetism precluded the idea that the earth acts as a single magnet. The poles of verticity do not coincide with the geometrical poles of the earth, nor do either of the foci coincide with the pole of verticity. The northern foci lie, one in the north of Canada and one in the north of Siberia.

The question of the nature and origin of terrestrial magnetism was considered. If the greater part of the earth's magnetism is due to the materials of which the earth is composed being permanently magnetized, then it is tolerably certain that this magnetic effect is wholly confined to a layer not much more than twelve miles thick. At that depth the rock material of the earth's crust is probably incandescent, or at least at a temperature of 800° C., and this is sufficient to destroy all magnetic quality in iron, magnetite, nickel or other magnetic bodies. On the other hand, we know that there are electric currents circulating in the crust of the globe, and a properly arranged flow of electric currents around the globe, flowing in the contrary direction to that in which the earth rotates, could be made to imitate the magnetic effect of the earth. These earth currents might exist at much lower levels than that at which any permanent magnetism of the material was possible.

Scientific Joking.

The dangers of "scientific joking" were never better exemplified than has recently been the case in the United States. D. Starr Jordan, president of Leland Stanford University, recently contributed an article to "Appleton's Popular Science Monthly," to which he gave title of "The Sympsychograph." This purported to be an exact account of the proceedings of the "Astral Camera Club" of Alcalde, California, whose members, by fixing their minds on the idea of a cat, succeeded in impressing that idea upon a sensitive photographic plate, and in thus obtaining a "thought photograph" of the animal. To add completeness to the "proceedings," the photograph of the "materialized thought" was reproduced in the body of the article. The "proceedings" as recorded were written in the customary serious vein usual to such records, but it is difficult to understand how any person could have read it without understanding that it was an elaborate "hoax," written ex-

pressly for "guying" many extraordinary accounts in the daily press of so-called "thought photography."

Our American contemporary, *Science*, and many daily newspapers, however, took the matter literally, and the former quoted the article extensively in the issue for 4th September. The following week's issue, however, contained an expression of regret that the comments should have appeared. It is undoubted that the "poking of fun" by such men as Mr. Jordan does considerable harm. Scientific men are, of course, not generally deceived by such a practice, but the daily press is always to the fore in "recording" any information of an "extraordinary" character, and no amount of subsequent contradiction will, in most cases, convince the general public that they have been hoaxed; in fact, it is very seldom that the daily press takes the trouble to publish a contradiction and an admission that it has been hoaxed. —Industries and Iron.

A THOUGHT-WEIGHING machine has been invented by Prof. Mosso, the Italian physiologist, the rush of blood to the head turning the scale. The machine is said to be so delicate that it can measure the difference in the exertion needed to read Greek from that required for Latin.

LUCIUM is the name of a new elementary body recently discovered by M. P. Barriere in the course of researches on the mineral monazite, which the discoverer proposes using for the production of an incandescent gas light. The atomic weight of lucium is calculated as 104.

Electrical Progress.

Proposed Changes in Ocean Cables.

It is now possible to talk with the aid of a telephone wire running overland with a person from 900 to 1000 miles distant. But at present no submarine cable in existence is adapted to telephony for more than fifteen or twenty miles. Probably the longest one in actual service is the one which reaches across the English channel, from Dover to Calais. Land lines may be connected with such a cable, though, so as to render conversation possible between points hundreds of miles apart. In telegraphing on a land line more than a hundred words a minute can easily be transmitted. But on the earlier ocean cables only about twenty or twenty-five words could be sent. On the best of them to-day the limit is about thirty or thirty-five. As each word contains five letters, on an average, and the electric current is broken and restored about three times to a letter, it will be seen that when the number of long and short impulses (or waves) exceeds 400 or 500 to the minute, they will not be distinct at the further end of an ocean cable long enough to reach across the Atlantic. But the vibrations of current excited in a wire by a human voice at a telephone are still more numerous, no matter how slowly one talks, and the clogging influence just mentioned blurs them into an indistinct murmur.

W. H. Preece, chief electrician of the British postal service, in a lecture before the British Association for the Advancement of Science, stated that he believes that the construction of a cable may be changed to reduce the trouble considerably. He proposes two changes: He would use paper instead of gutta-percha for the insulating material lying next to the metal, and then he would bring the conductors which carry the outgoing and return currents much closer together than ever before. For instance, the English channel cable has four separate round copper cores. Two are so connected with the other two as to serve as return wires. The distance between the members of a couple is a quarter of an inch or more, and the four wires are embedded in gutta-percha. Mr. Preece proposes to make the copper in his new cable half round, place two such wires together with only a thickness of paper between their flat faces, and then wind the pair with paper before putting on the outer coat of gutta-percha. One-half of such a core would be the return wire to the other half, and, consequently, four cores would permit four conversations at once, whereas the Channel cable allows only two.

Electric Industry in the United States.

In the electric lighting field the total capital invested in the United States is given as over $500,000,000. The number of plants, public and private, is over 10,000. The number of motors in use is estimated at about 500,000, and their value at about $100,000,000. The electrical apparatus used in mining is estimated at $100,000,000, and the value of the electric elevator industry will probably not fall short of $15,000,000.

The most important of all the electrical industries, however, is that of electric railways. In this field the investment is very great, and in the United States is represented by a capitalization of over $700,000,000. The number of trolley cars in use is said to be over 25,000, and these run on over 12,000 miles of track. The electric railways represent more than 90 per cent of all the street and suburban railroads of the country.

The aggregate of all the capital invested in electric lighting, electric railways and electric power is about $1,500,000,000, and this does not include the value of the establishments that manufacture the machinery and apparatus. As many of these are among the largest industrial enterprises in the world, and as nearly all are concerns of considerable magnitude, it is very evident that their combined capital will run up into large figures.

Inasmuch as the electric light and power industry represents an investment of about $1,500,000,000, without counting the value of the concerns that manufacture the machinery and supplies, it is evident that to estimate the total investment in every department of the electrical industry at $2,000,000,000 in the United States alone is not extravagant, for this would allow only $500,000,000 to cover the value of the telegraph, the telephone and the almost unlimited number of electrical manufactories, large and small, that can be found, from one end of the land to the other.—Cassier's Magazine.

THIRTY-NINE MILES an hour was made by a special car on the Akron, Bedford & Cleveland Electric Railroad, between Cuyahoga Falls and Newburg, Ohio, recently.

Practical Information.

Cleaning and Sharpening of Files.

Files and rasps used for working tin and lead can be cleaned and sharpened in the following manner: Dip the file for a few seconds into concentrated nitric acid until reddish brown vapors commence to ascend lively, then rinse in water, rub with a sharp brush and imbed the file in sawdust or coal dust, or dry it quickly for immediate use. A file clogged up by iron filings should be dipped into a watery solution of copper vitriol, by which the filings are dissolved and copper precipitated in the form of a slimy sediment, while the body of the file is attacked but little. Afterwards rinse the file in water, brush off, dip into nitric acid and conclude treatment as above. Files dulled by zinc filings are given a bath in diluted sulphuric acid, otherwise they are subjected to the same treatment. Clean all files used for working copper by means of nitric acid, but repeat the process several times, because the first time much copper is precipitated that adheres tenaciously to the body of the file. Files used for working wood are first put into hot concentrated sulphuric acid, rinsed, brushed, then dipped into lye of potash, rinsed and brushed again and finally dried. Drying can be accomplished best and quickest by pouring alcohol over the file and burning it off.—American Manufacturer.

THE British Consul at Iquique reports that great quantities of machinery of every sort, locomotives, boilers, tanks, are constantly required both for new works and for maintaining the old ones. The British manufacturers hold their own without difficulty. Their efforts to secure trade are worthy of success; they issue catalogues in the Spanish language, and, when possible, prices are affixed. Sterling prices are quite sufficient, the unit in this denomination being commonly used throughout Chile. In one department, however, we are often run out of the market, viz: in electrical machinery and appliances. The United States is able to turn out satisfactory work in this line, well finished and up-to-date, and it may be observed *en passant* that the commercial travelers representing the hugely capitalized companies in the States seem to have more push and to be more active than their English confreres.—London Machinery.

IT is probable that within a few weeks the future of one of the most neglected but one of the most promising of British colonies will be finally settled, says *Industries and Iron*. In British Guiana we have a region which is perhaps one of the richest mineral areas in the world. It is intersected with waterways, more or less navigable, whilst the Barima river offers a main water course on which the country may be penetrated to a considerable distance by vessels of large displacement. Doubtless the first step which will be taken as soon as the settlement is arrived at will be the construction of the Barima railway, which has already been partly surveyed. A considerable number of mining properties, too, are being steadily developed, and we may soon look upon British Guiana as an opening for plant and machinery that is likely to vie with South Africa itself.

A CURIOUS METHOD of producing platinum is practiced by the inhabitants of the villages on the Tura river in the Russian Government district of Tomsk in Siberia. They call this method "plowing the water." A raft is constructed and an inclining gutter of boards fastened to it, which at its lower end is provided with an iron plow. While floating down the river they scrape and plow its bottom. The sand scraped out falls into the gutter and passes into a tub filled with pine boughs, upon which the platinum is deposited. The sand of the Tura river and its tributaries is so rich in platinum, and its primitive production so profitable, that the peasants are abandoning agriculture and devoting themselves to "plowing the water."

THE automatic machine idea has been turned to new account in Italy. Put a coin in the slot and take out a receipt and the thing is done. The workingman's "honest penny" is banked without the trouble of going to a savings bank or postoffice. When a sufficient number of receipts have been collected they can be exchanged for a "libretto" at the regular savings bank. Interest at 4 per cent is paid on deposit, and the depositors are entitled to a share of the profits derived from the bank's operations.

THE moment that a young crocodile breaks its shell it is to all intents and purposes as active as it is at any time during life. It will make straight for the water, even if it be out of sight and a good distance off, and it will pursue its prey with eagerness and agility during the first hour of its free existence.

PROF. FHELTOHUE says that if we reckon the depth of all oceans at an average of three miles there would be a layer of salt 200 feet thick in their basins, should the waters of all suddenly evaporate.

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FOR SALE.
Gold Mining Property,
Situated in the Silver Peak and Red Mountain Mining District, Esmeralda County, Nevada, the property of James O'Hale, deceased, comprising three claims well developed, mill site and spring, 2-stamp mill, engine (6 H. P.) and boiler, complete set of tanks and all requisites for cyanide process, mining tools, horse and wagon, two sets of harness, comfortable house—all to be sold as a going concern. Offers will be received by STAFFORD O'NEILL, postoffice address Silver Peak, Esmeralda County, Nevada.

WANTED,
A position as Superintendent or Assistant Superintendent in copper-silver or silver-lead smelting works.
Understands mining, sampling, assaying, furnace management, handling men.
Prefer Mexico or Spanish South America. Speaks Spanish. Best references.
Address METALLURGIST this office

THE CALIFORNIA DEBRIS COMMISSION, having received application to mine by the hyraulic process from William Konradi, in the Blackwater Claim, near Spanish Ranch, Plumas Co., to deposit tailings behind the Quincy Mining & Water Company's impounding works in Spanish Creek; from Walter Shackleford, in the Grub Flat Mine, No. 2, near Meadow Valley, Plumas Co., to deposit tailings in Reservoir Ravine; from Pitro Picolo and Luigi Sobrero, in the Cleveland Placer Mine, near Johnsville, Plumas Co., to deposit tailings in a ravine below the mine; from Francis Jackson in the Sebastapol Flat Claim, near Spanish Ranch, Plumas Co., to deposit tailings in an old pit; from La Mont Brown, in the Preacher's Ravine Placer Mine, near Scales, Sierra Co., to deposit tailings in Preacher's Ravine; from F. B. Clark, in the Clark and Willis Mine, near Railroad Flat, Calaveras Co., to deposit tailings in a ravine below the mine; from Charles Edner, in the Lady Edner Mine, near Omo Ranch, El Dorado Co., to deposit tailings in a ravine below the mine; from Em Santirfo, in the Santa Clara Mine, near Volcano, Amador Co., to deposit tailings in South Branch of Sutter Creek; and from Eckart & Solario, in the Campi Placer Mine, near Volcano, Amador Co., to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on November 16, 1896, at 1:30 P.M.

IMPROVED MINERS' LANTERN.
A light, simple, cheap and efficient Lantern which will remain lighted in the strongest drafts. County or State rights for sale on royalty. MRS. HATTIE DELZELL, Jackson, Cal.

Mining Summary.

CALIFORNIA.

Amador.

Record: The shaft in the Gwin mine is down 1420 feet. The 1200 and 1300 foot levels show ore bodies 10 to 14 feet thick. The mill work will start December 1st.

The San Francisco men who purchased the Allen and adjoining quartz properties at this place have let the contract for a 40-stamp mill, and several men who are to be employed upon the construction have already arrived. A temporary hoisting plant is to be put in, as it has been decided to replace it with electric power from the Blue Lakes plant as soon as that is completed.

At the Pocahontas mine in Drytown district the shaft is down 90 feet and in the crosscut four ledges have already been encountered. The last one struck is 23 feet wide and prospects well.

At the Bay State mine in Plymouth district the 10-stamp mill is running regularly on good rock from the 700-level, where drifting and stoping is in progress. On the 300-level a crosscut is being run for the west ledge. It is in about 50 feet and they expect to encounter the vein in about 300 feet.

Ledger: Clark and Madden are about to let a contract for driving a tunnel 300 feet on the Mokelumne river near the Madden home.

The power was turned on the 10-stamp mill at the Red Hill mine last week to test the running of the machinery. Five stamps will be put in operation by the 1st and the other five a week later.

James E. Dye, the general manager of the Jackson Exploration and Development Company, has received instructions by cablegram to go ahead at once and sink the shaft of the Amador Queen Mine No. 1 to a depth of 1000 feet.

Ledger: The Venus mine at Campo Seco, which has been idle for some time, has been reopened by a Chicago man, Mr. Leszinsky, who has sunk a 2-compartment shaft a depth of 100 feet. Good ore was discovered at 80 feet.

Dispatch: Read, Boyer and Tonzi are about to start work on the Full Moon Mining claim about five miles below Sutter Creek. The property contains a large talc ledge which carries considerable gold. A number of parties heretofore have tried to work the talc, but could not make it a success.

Republican: At the Good Hope mine the 10-stamp mill is nearing completion.

The Reward Mining Company is adding five more stamps to their mill.

The Dane mine is being put in running order.

The company at the White mine on the Dennis Kelly ranch is putting up some heavier hoisting machinery.

Butte.

Oroville *Register*: J. Champion of the Red Point mine at Enterprise has run a tunnel a distance of 300 feet. Lately he let a contract to run another 100 feet and expects to tap the ledge at a depth of over 300 feet. He has recently erected two buildings at the mine and is getting everything in good shape for the winter season.

Frank Elliott has engaged a company to work his mine at Swede's Flat, and will begin shortly.

Mercury: T. L. Vintin has increased the force in his mine at Cherokee to thirty men, and work is progressing rapidly.

Calaveras.

Citizen: The Encino mill at Chile Gulch has started up and it is reported that some rich gravel is being crushed.

Preparations are being made to begin work at the Meinicke gravel mine, near Vallecito as soon as the winter rains begin. A reservoir is being built and thirteen men are preparing for hydraulicking.

James Gleason of Central Hill is negotiating a bond on the gravel channel embracing the properties of Pfortner, Burns, Salcido and Swenson. The deal will be consummated within a week and work will be commenced on the property immediately. Mr. Gleason represents Messrs. Snedigar, Sullivan and other San Francisco capitalists.

Articles of incorporation have been filed at Stockton by the Lightner Mining Company to work the Lightner gold mine, situated in Angels Camp, on the Utica and Stickles vein. This property belongs to the Eastland estate.

The new 4-stamp mill on the Blue Bell mine, near Glencoe, is almost completed, and the stamps are now dropping.

Chronicle: Active operations have been resumed at the Del Ray mine at Middle Bar.

Sinking is soon to be commenced on the Thorpe mine. The shaft will probably be sunk between 200 and 300 feet deeper before the construction of the mill is commenced.

El Dorado.

Republican: At the Burton mine, the south extension of the St. Lawrence, near Kelsey, the new owners are putting up a steam hoist with a capacity to sink 500 feet. They have a ledge from 4 to 8 feet wide on which a shaft has been sunk to a depth of 160 feet.

An undivided one-half in the Boulder Hill placer mine was recently sold by Stevenson & McKinney to Hungerford & Rouse of Antioch. The new owners are working together to develop the property, and they are reopening the old Steele ditch to get water from the head of Ringgold creek.

Kern.

A five weeks' run of one mill on Rand ore netted $21,000. The other mills are running night and day, and work is in progress in the construction of two more mills. Great quantities of ore are piled up, waiting to be worked. A cyanide process mill is also to be erected at once.

There are some very good mines in the district, but for want of water for milling, they labor under a great disadvantage. The ore is hauled twelve and twenty-six miles to mills, and it costs $10 to $15 per ton for working. Ore not yielding $40 does not pay to mill. Randsburg district contains a population of about 500. There are very few wooden buildings. There is no lumber in camp. People do business in tents of various sizes. Lumber, when there is any, is $40 per thousand rough. Hay sells for $25 per ton; barley, $1.40 per sack; water is hauled six miles from a well and costs 4 cents per gallon delivered.

Nevada.

Union: At the Orleans they have struck a stringer of fine ore in the 700 level which promises to develop well. It shows considerable free gold. This is the first gold-bearing ore discovered below the 200-foot level.

At the Electric mine Supt. Coffin has a good 18-inch ledge.

Telegraph: At the Pennsylvania mine on the 600-foot level a 2-foot ledge with considerable sulphurets and carrying free gold has been encountered.

Placer.

The hoisting works at the Gray Eagle mine, near Butcher Ranch, have been destroyed by fire. Work will be continued through the tunnel as heretofore.

Plumas.

(Special Correspondence).—Times are lively about Slate creek. The Garnett Company (formerly Bunker Hill and North American) are working a large number of men and making money.

The Thistle shaft keeps now 125 men active, and many drift mines are in operation between Bunker Hill and La Porte, a distance of eleven miles, while in the bed of Slate creek about 300 men are busily and profitably employed working tailings. Among them the Alturas Company (Hendel & Packer) are undoubtedly doing the best work and reaping the largest benefits from their energy and practical working methods. It is a fact that, while the English company operating extensively in Slate creek two years ago failed of success after a large expenditure, individual miners are now reaping a rich harvest with the simplest of appliances, as sub-leasers of the same ground. And yet there is abundant room for the application of capital, joined with judgment and experience, to the gravel deposits of this region.

La Porte, Nov. 3rd, '96.

In the North Fork country E. E. Ross, in his mine on Marion creek, has completed a large restraining dam and will do some heavy piping next summer.

It is livelier on that part of the river than it has been for thirty years.

J. F. Cummings of the Sunnyside mine has just put on a full force, and they are taking out from 50 to 60 cars per day.

The two mining companies known as the Golden Ancient Channel and the Yellow Jacket have been consolidated and incorporated with the following officers: President, Rufus Fisk; vice-president, Guy H. Salisbury; secretary, J. M. Haskins. Directors—Rufus Fisk, Guy H. Salisbury, J. M. Haskins, F. J. Smith, T. A. Rogers, Perry C. Smith. The capital stock is $100,000. The company is preparing to operate the mine on a large scale next spring. The shaft is down 160 feet. The company will put in a pump and other machinery to explore the channel thoroughly.

National Bulletin: Capt. C. E. Gillette of the California Debris Commission has visited and accepted the new restraining dam erected by the Quincy Mining and Water Co. across Spanish creek. This dam is the largest in that part of the State. It is 130 feet long at the base, 300 feet long at the crest and 30 feet high in the central part. It is a log crib structure, the bottom logs bolted to the bedrock, three tons of rods having been used for this purpose. This dam will hold debris on an area of 60 acres above it and enable the company to operate the mine for two years. The dam at Wauponsee creek is being raised.

Capt. Gillette, accompanied by A. W. Keddie, C. E., also visited and examined several other Plumas mines, with the view of granting permits to erect restraining dams, etc., among them the Gumbert mine at the head of Poplar creek, the Shackelford and the Shackelford & Brown mines at Meadow Valley, the Leek mine on Rush creek, the Taylor Diggings properties between Genesee and the North Arm and the Ross mine on the North Fork. It is evident that, with the opening of the water season, numerous Plumas county mines will begin operating.

Sacramento.

Large quantities of lumber and machinery are being hauled to the scene of operation of the River Bedrock Mining Company, at the mouth of Alder creek, about three miles from Folsom.

San Bernardino.

San Bernardino *Sun*: Harrison & Willard have shipped to their mines near the Kern county line, in the Randsburg and Goler district, a load of lumber and equipment for a 10-stamp mill, which will be put up at Cuddeback's Dry lake, where a sufficient flow of water to supply ten to twenty stamps has already been developed. The mill site is fourteen miles from Randsburg, in this county. They will do custom work for such of the miners of the Randsburg, Fremont Peak and Goler sections as wish to haul their ore to the new mill.

San Diego.

The statement of the Golden Cross mines from August 15 to October 15th shows the bullion product from the mill to be $45,349; total receipts, $48,445; disbursements, $37,091, of which $20,059 was paid for labor. In the Cross mine on this property a 16-foot ledge of fine ore has been developed. The ledge has been opened for 60 feet, showing enough ore in sight to keep 100 stamps busy for at least six months. In the Crown mine a ledge of high-grade ore has been opened. The receiver of the Golden Cross properties thinks he can soon apply $20,000 monthly toward the payment of the debts of the company.

Escondido gold mines cleaned up $4000 in seven days' run.

Shasta.

Free Press: Dale & Duncan, owners of the Star of Hope mine near Churntown, are shipping ore from their mine to the smelter at Keswick for reduction. The ore is taken from a well-defined ledge 2 feet in width, and which has been crosscut at a depth of 70 feet.

John Wright has bonded his mining property in the Spring Creek district to Kahny & Burgbacher for $1000.

Sierra.

Messenger: Mr. Copeland has now about thirty-five men employed at his two properties in Slug Canyon.

Enterprise: Twenty men are employed at the North Fork claim at Forest City, and preparations are being made to more extensively develop that extensive mining property.

Messenger: There are thirty-three men at work on the Copeland-York mine, in Slug canyon. The two tunnels on the ledge are being retimbered and driven ahead. Pack trains are delivering lumber on the property, to be used in putting up buildings for the winter.

The Mabel Mertz Mining Company, composed of Forest capitalists, are running a tunnel to tap the old Nebraska lead. The tunnel is now in 350 feet, and a fine body of gravel has been struck.

At the Van Clief mine, the Prospect Mining Company have five men at work driving the tunnel ahead.

Siskiyou.

Yreka *Journal*: The owners of the Garrett mine, below the mouth of Scott river, at Hamburg bar, are reported to have struck very rich ground, about $500 having been taken out to the bucket.

The Distlehorst & Barton Dredging Company are working their dredger at Buckeye Bar, and are now taking out good pay gravel. The large boat is anchored close to the shore, and the heavy machinery is run by a 25-horse power engine. The large scoop plunges down between the boats, bringing up about a ton of earth, and the gravel is raised and dumped into a large shaker, which sifts all the sand and fine gravel into the sluices, while the boulders pass off through a chute into the river.

Journal: The owners of the Gardner mine at Oro Fino will be enabled to start up soon, as it does not require as large an amount of water as the other hydraulic claims around Oro Fino. The Eastlick Bros. and Wright & Fletcher mines are never worked a great deal until along the first of the year, when the owners put large forces of men at work and are kept busy until fall.

The Erno mill is nearly completed at Muginsville, and it is expected it will be ready for operation early this month.

The Spengler Bros., at the mouth of Humbug creek, Klamath river, are now able to commence work on an extensive scale, as the late rain storms furnished a good supply of water, besides snow on the high mountain peaks to keep it up until the regular winter storms begin.

Trinity.

Redding *Free Press*: A consignment of 17 tons of sulphurets has been sent to the Selby Smelting Works from the Brown Bear mine.

Hundreds of thousands of dollars are being expended in the development and equipment of the great hydraulic mines of Trinity county. The latest improved and most expensive machinery is being put in. A lot of patent iron water gates of very large size are now lying at the freight depot here consigned to the C. F. D. P. Hydraulic Mining Company at Junction City, Trinity county.

Tuolumne.

Union-Democrat: The Golden Rule shaft will soon be down to the 600 and drifting on the ledge will then commence.

Everything at the Marlowe is about ready to start up since the recent rain.

At the Jumper a new three-compartment shaft will be sunk on the ground dividing the New Era and Jumper ground. It will be one of the best pieces of work on the lode outside of Coulterville, where the Merced Company sank three shafts of the same character. The old incline on the New Era is being overhauled and will be used until the new shaft is ready. The contemplated improvements will cost $40,000.

At the App, owing to a scarcity of water, the mill has been closed down for a time. There is enough water to continue operating the hoist and keep the mine dry.

At the Belleview the big pump, which is one of the largest in the county, is being placed in position. Supt. McDonald is anxious to begin stoping right away and is rushing the work.

At the Dutch the new gallows frame has been erected. The mill is kept crushing on rock that was mined and stored some time back. A well equipped machine shop has been added to the plant.

NEVADA.

LINCOLN COUNTY.

(Special Correspondence).—The Dolly Gold Mining Co. has suspended operations on account of the withdrawal of L. E. and H. L. Van Winkle of San Francisco from the company.

Dan Murphy of the Needles firm of Monaghan & Murphy recently passed through this place in company with a representative of an English syndicate, who had been experting the Capital group of mines, with a view to purchasing the same.

W. C. Wallace of San Francisco is now in London seeking capital for the development of his mines, located in this district. He is expected to return soon and to begin extensive operations.

Since the death of W. S. Mills, the former manager of the Southwestern Mining Co.'s mines, that company's affairs have been at a standstill. It is learned, however, that Chas. Gracey of Amador county, Cal., has been appointed manager, and is now engaged in paying off the back indebtedness and adjusting matters preparatory to a new start. Mr. Gracey will, after spending a few weeks in California, attending to business of a personal nature, engage in prospecting the company's property, consisting of a group of several mines, situated in El Dorado Canyon. These mines were formerly worked for gold and silver, but in future will be worked for free gold alone.

El Dorado Canyon, Nev., Oct. 26th, '96.

Silver State: One hundred men and fifty teams have gone into the Island mountain country, Elko county, where work will be vigorously pushed all fall, so that operations will begin in the spring. The company has 5000 acres of valuable placer ground. A few days since a rich strike of gold ore was made in Tennessee gulch. The ledge is large and displays immense quantities of free gold.

Pioche *Record*: Encouraging reports come from the Sunrise mine. The tunnel is now in about 345 feet. At present it would be a good one if the owners had a plant to reduce the ores.

Ely *News*: Commencement of work has been made on the Star and Gray Eagle mines, near Cherry creek, through the efforts of A. C. Cleveland.

Belmont *Courier*: The gold mines in western Nye are yielding rich ore, and the mills are turning out bullion regularly.

OREGON.

Baker City *Bedrock-Democrat*: The termination of the Virtue mine suit will be the means of adding new life to the camp. The Virtue is one of the oldest mines in this section, and under the ownership of Geo. W. Grayson has always been known as a good producer.

The placer mining season is drawing to a close. The output has exceeded all expectations, and indications point to an increased output next season. Our placers are a great source of wealth to Baker City.

Wm. White, Jr., of Pittsburg, Pa., a representative of a company of Eastern capitalists, is inspecting a number of mining properties near Baker City.

The hills around the Virtue district are full of prospectors and mining men, and the camp presents a very lively appearance.

At Cornucopia, in the Union-Companion mine, a good-looking ledge has been exposed in the 1000-foot level. An electric light plant furnishes light for both the mill and mine. The company is now putting in a 275-horse power engine and boiler, an air compressor and two rock drills. The capacity of the milling plant is about 50 tons per day.

The Red Boy has over two miles of development work. The mine is closed down at present, pending the result of the O. G. M. Co.'s suit.

The White Eleghant shows a strong four-foot ledge, the ore running from $3 to $8 in free gold, and from $120 to $140 in concentrates.

Grant's Pass *Observer*: Taylor & Crow, who have a quartz mine on Lost Flat, near Galice creek, have received returns from 12 tons of ore which averaged $125 per ton, and the ledge is 36 inches wide and getting richer as depth is reached.

George B. Ward, who is interested in mining property on the Illinois, has shipped a large lot of supplies of pipe, giants and general implements for mining. They expect to be ready for work as soon as water comes.

BRITISH COLUMBIA.

The customs returns for the year so far from the port of Nelson are as follows:

	Gold—		Silver—	
	Ozs.	*Value.*	*Ozs.*	*Value.*
Quarter ending—				
Mar. 31	5,702	$102,644	706,605	$ 469,815
June 30	5,749	104,484	407,081	270,585
Sept. 30	14,901	268,215	529,422	355,824
Total	26,352	$475,343	1,643,108	$1,096,224

	Copper—		Lead—	
	Tons.	*Value.*	*Tons.*	*Value.*
Quarter ending—				
Mar. 31	282.2	$ 35,474	2181.9	$ 70,887
June 30	542.4	59,814	1153.4	33,784
Sept. 30	559.8	67,773	1525.0	38,723
Total	1383.6	$163,061	5062.3	143,394

SUMMARY.

Gold	475,343
Silver	1,096,224
Copper	163,061
Lead	143,394
Total	1,878,022

To this must be added about $500,000 for the Slocan ore which has been sent out by way of Nakusp and Revelstoke and does not pass through the port at Nelson. This brings Kootenay's exports for 1896 up to the end of September to $2,378,022.

Eighty new mineral locations were recorded in Nelson last week.

W. A. Carlyle, the provincial mineralogist, has completed his work in the Slocan and returned to Victoria.

The Royal Gold Mining Company, with headquarters at Spokane, has been incorporated with $3,000,000 capital stock.

L. M. Davenport and others, representing Eastern parties, have purchased one-half of the Deer Trail No. 2, in the Cedar canyon district, near Davenport, for $30,000. The property is well known and has produced a large amount of high-grade silver ore. Seventy-six thousand dollars' worth of ore has been marketed this year and $40,000 in dividends have been paid.

One-half in the St. Keverne group of mines

in the Slocan has been bonded to California parties for $10,000.

ALASKA.

The last annual report of the Alaska Mexican Gold Mining Company is a good record of mill management: Number of stamps, 60; weight, 1020 pounds. Drops per minute, 97; height of drop, 7¼ to 8¼ inches. Total tons crushed, 79,439 of 2000 pounds. Tons of concentrates produced, 1597. Total time lost in twelve months, 5 days 16 hours; of this, time taken for clean-ups, 2 days 12 hours. Actual lost time from other causes, 3 days 4 hours. The duty of the stamps was 3.68 tons per 24 hours of running time, the ore being hard quartz and the screen 40-mesh. The total cost of milling, inclusive of the chlorination of sulphurets, was 45 cents per ton of 2000 pounds. This includes machinery of every description, costs of repairs and renewals of machinery. The mill was operated 207 days by water power and 152 days by steam power.

H. V. Burner, a San Francisco mining expert, acting for California parties, has bonded William Milmore's mining claims near Sitka for $15,000.

News: The Eastern syndicate which purchased the Alaska-Willoughby mines will shortly begin extensive development work. A two-compartment shaft will be sunk to a depth of 250 feet, 200 feet below the drainage level, and at intervals of 100 feet levels will be run to connect with the shaft. New hoisting works will be put in, and as soon as sufficient ore is blocked out the mill will be increased to thirty stamps, as was the original intention of the old company. Work on the King group will be carried on simultaneously with that on the claims on the beach, one of the first improvements to be made being the construction of the narrow-gauge road connecting the upper claims with the mill.

The Apollo Company have on their payrolls 175 men. Two new engines have been installed—one to drive the compressor and one of 125-horse power, of the Corliss pattern, to run the mill. The new three-compartment shaft is now down 100 feet, and work has been commenced on the station to run a crosscut for the ledge. The mill is averaging between $35,000 and $40,000 a month.

A crew of men has begun operations on the Sitka mine.

Considerable prospecting has been done this season on Kodiak, Afognak and Whale islands. On the latter island J. J. Bannan has struck a two-foot ledge of free milling quartz which assays well.

UTAH.

Salt Lake *Tribune*: At the Golden Gate in Mercur it has been variously estimated there is in sight from five to seven million dollars in gold ore, and it is asserted that assays have been made showing as high as $200, and that the average value is between $15 and $20. Yet it is unknown when this company will build a mill.

At the Sacramento, with their mill enlarged, they are now handling a daily output of 100 tons, some running as high as $20 per ton, and giving an average of $8 per ton.

The reduction of the cyanides by the Marion Company will soon be a settled fact, as experiments have demonstrated that they can do as good work, and do it as cheaply, as any of the Eastern concerns. It is the intention of the company to establish a custom refinery to handle all the cyanides in the district.

The Gold Dust has found a vein 20 feet in thickness and carrying good values, and enough development work has been done to show that the property is of sufficient value to justify the expense of a mill.

IDAHO.

Spokesman-Review: The Poorman-Tiger, at Burke, is constantly lowering the water in the shaft. Considerable trouble was experienced shortly after the new hoist was put in, and for a while the water rose in the shaft. There is now about 600 feet to take out.

The leasers on the Galena expect to commence work about the first of next month.

The Yosemite, at Murray, is again running full time, the mill having only been running a day shift. The vein has widened out until there is no probability of a shortage of rock for a long time.

Larsen & Greenough, at Mullan, are going to enlarge the Morning mill. The Morning and You Like mines are now showing up ore so well that there is no trouble keeping the mill supplied.

Considerable ore has been struck in the Topeka, near the head of Nine-Mile. The strike was made near the surface and the ore shows chloride of silver, bromide of silver, galena, from $8 to $35 in gold, and traces of copper.

Mining Journal: The second washup of the Cariboo hydraulic mine amounted to about $30,000. They are still piping on No. 1 shaft, and will probably have another washup this fall, but that depends on the amount of water. The two washups for the season come to about $120,000.

WYOMING.

The new gold mines recently discovered in southern Wyoming are situated on the south fork of the Grand Encampment and its tributaries. Many prospectors have already reached the district, and locations are being made in every direction. In some instances there are six locations on a single claim. It is estimated that there are 200 miners in the district. The district is thoroughly organized with good officers, and excellent rules have been adopted for its management. The formation of the district varies and seems to run in distinct belts in a northwest and southeast course, consisting of mica schist, quartzite, lime and granite. The veins will average about three feet in width, and in most cases show free gold by panning. Assays made on different ores run from a trace to $40 per ton gold. The streams and gulches along the belt show well in placer gold and have all been located. On Spring and Jack creeks work has been successfully carried on for the past two years. In several places it is claimed that the miners are making good wages with the ordinary sluice boxes.

COLORADO.

Denver *Republican*: Has Cripple Creek paid? Has this vast amount of prospecting paid its own way and, on the whole, has the camp been a profitable investment? A carefully prepared summary on the value of the gold belt was published a few weeks ago. Therein its actual cash value was placed at $100,000,000; the speculative value at twice that amount. Now, to arrive at the cost of this immense value, the following estimates appear conservative:

There have been, approximately, 9000 locations of all kinds made in the district. Many of the locations never got beyond the stage of a 10-foot hole scratched in the hillside, a survey and recording fees; others cost into the thousands when attorney fees and court costs were to be added, but generally in such cases the ore was paying the freight on such as these. Therefore, these estimates are at best liberal:

4,000 patented claims costing an average of $500 each	$2,000,000
5,000 unpatented locations, costing an average of $100 each	500,000
Cost of the claims	$2,500,000

To say that for the past three years an average of 1000 lessees have been at work developing this ground that represented an expenditure of $2,500,000, and that each of these 1000 men were expending in labor and ammunition on the ground an average of $1000 each, looks to be an exaggeration, but put it at that and we have $3,000,000 expended by lessees.

Money spent in the purchase of ground and in prospecting the same is yet more difficult to arrive at. Adding all the large sales that can be remembered and doubling the sum gives $1,500,000, and it is extremely doubtful whether that sum of outside money, that is, money not extracted from the district itself, has been expended in the purchase of claims.

This, then, gives for the total cost of the Cripple Creek district, for all its prospecting, its purchase, for the opening of the mines and their equipment, the following:

First cost of ground	$2,500,000
Work of lessees	3,000,000
Capital invested in second purchases	1,500,000
Total	$7,000,000

Against this the output of the camp stands as follows:

1892	$ 600,000
1893	2,100,000
1894	3,000,000
1895	8,000,000
1896	10,000,000
Total	$23,700,000

If these estimates of first cost and the former ones of present value be as conservative as were the efforts to make them so, the balance sheet gives the district credit with $23,700,000, against a debt of $7,000,000.

T. J. Moynahon has received his patent for the Pike's Peak placer, consisting of 86 acres of ground that extend from Golden avenue west of First street to Mineral Hill in Cripple Creek. Many thousand dollars have been taken from the ground by placer mining, but now that patent is secured lessees are going after lodes of which several are said to exist.

A four-foot vein has been cut 80 feet from the shaft at the 200-foot level of the Colorado City on Bull hill. The ore runs two ounces without sorting. The north half of the claim was bought by the Golden Fleece Company some months ago for $65,000, and systematic development started.

The Ben Hur Company are considering a tunnel proposition whereby 600 feet of their property will be prospected without cost to the company.

The Victor will output more ore this month than any previous month of its operations.

The large pump for the Arcadia has arrived and will be put in place at once. Sinking the shaft was suspended at the fourth level.

In the Alma district is reported a new strike recently in the Zuri claim on Loveland, up Buckskin gulch, and a mill run shows 40 per cent iron, over $20 in gold and small silver values per ton. The vein is well defined and ore more than seven feet in width.

Three sales have been made of property in the North Mosquito district within as many weeks, that of a controlling interest in the Troy group to Chicago capitalists for $100,000 being the largest.

The production of the properties operated by the Gold Coin Mines Company in Nevadaville during the past month is the largest under its present management, about $28,000 from 1750 tons of ore.

At Idado Springs the Newhouse tunnel people have some big plans for treating low grade ores; they will cut in Clear Creek and Gilpin counties. They will erect mills at the mouth of the tunnel. They have bought most of the ground lying along Clear creek in the lower end of town.

Drifting has been commenced at 560 feet in the Crown Point-Virginia shaft and three feet of pay ore is being blocked out, with some shipments.

W. H. Smith and W. H. Wiley have secured control of the Edgardine property, and it is understood that an agreement has been made with the Newhouse tunnel management for the sinking of the shaft 600 feet to connect with the tunnel and thus make the first air hole connection with that big bore.

NEW MEXICO.

Silver City *Enterprise*: At Pinos Altas the Treasure Mining Company has about thirty-five men employed in the Atlantic mine and mill.

N. Bell has brought from Pinos Altos two gold bricks, which weighed 328 ounces, the product of ores from the Mina Grande and Pacific mines.

Chandler & Co. have cleaned out and drained the Mountain Key mine to the 300-foot level. The levels and stopes have been retimbered and ore is being extracted from the 200-foot and 300-foot levels.

The Golden Giant Company is working forty-five men at the mine and mill. The mill is kept running constantly on the product of the mine. Sinking the shaft below the 400-foot level progresses at the rate of a foot per day.

SOUTH AFRICA.

Reports upon the cyanide process in the big plants on the Rand show that the cost has been considerably reduced. The return of the Robinson cyanide works (zinc precipitation) for the year 1895 was:

	s.	d.
Wages (whites and natives, with food)	0	7.42
General supplies (stores, assay material, etc.)	0	2.76
Fuel	0	2.82
Cyanide, .46 pounds	0	9.88
Zinc, .16 pounds	0	0.66
Filling and discharging	0	9.51
Cost per ton	2	9.05

The Crown Reef return is as follows:

	s.	d.
European wages	0	4.201
Kaffir wages	0	1.784
Stores and materials	1	7.111
Maintenance	0	2.223
Contractor (filling and discharging)	0	7.768
Power and light	0	0.962
Cost per ton	3	0.049

At the Worcester works the costs were:

	d.
Filling and discharging	10
Cyanide (¼ pound)	6
Zinc	1.2
Caustic soda	0.5
Lead	1.1
Iron	2.2
White labor	5.2
Native wages and food	1.9
Coals	4.6
Stores and general charges	3.2
Cost per ton	35.45 (say 3s)

This was with cyanide at 2s per pound. With cyanide at this figure the economy in this item might counterbalance the heavier precipitation charges. Cyanide is now 1s 1½d per pound. The zinc charge at several mines is as low as 7d per ton. Lead and iron alone at the Worcester cost 3.3d per ton. The following table shows the costs for the City & Suburban for August, treating 15,410 tons:

	s.	d.
White labor	0	2.362
Kaffirs (food, etc.)	0	0.369
Stores and sundries	0	0.255
Chemicals	0	0.260
Zinc	0	0.6178
Cyanide	0	10.5011
Assaying and smelting	0	1.4520
Vat filling	0	3.8308
Vat discharging	0	7.3954
Electricity (light and power)	0	.1928
Maintenance	0	.3721
Cost per ton	2	3.608

Even assuming that a saving in cyanide to the extent of 6d is achieved, this is fully counterbalanced by the cost of the lead, iron, power for dynamo, and extra charges due to greater cost of plant in the case of electrical precipitation.

Mining Journal: The following is the directors' report of the City and Suburban for August: Profit for the month, £13,711 17s 3d; capital expenditure, £3106 6s 6d; total expenses per ton, 25s 10.2969d; value of yield per ton, 39s 6.8961d; profit per ton, 13s 8.5992d. Extract from manager's report: The main incline shaft (20 feet by 5¼ feet) has been sunk 29 feet 8 inches; total to date, 1749 feet 2 inches; driving and sinking done during the month, 1177 feet 9 inches; ore developed during the month, 16,038 tons; estimated quantity of ore developed at 31st of August, 390,053 tons. The milling results for the month are as follows: One hundred and sixty stamps worked twenty-three days three hours eight minutes; tons (2000 pounds) crushed, 19,450; tons crushed per stamp per day, 5.255; yield in smelted gold (equal to 5855.0060 ounces fine gold), 6774.8 ounces bullion; yield per ton by amalgamation, 6.9663 dwts bullion; assay value of tailings per ton, 5.748 dwts fine gold. The results by cyanide treatment for the month are as follows: Tons (2000 pounds) treated at a cost 4s 6.4710d per tons, 15,587; assay value of tailings per ton before treatment, 5.778 dwts fine gold; bullion produced (equal to 3267.0886 ounces fine gold), 4019.6 ounces; yield of gold (in bullion) per ton treated by cyanide, 5.1576 dwts; yield of gold (fine gold) per ton treated by cyanide, 4.1920 dwts; yield in fine gold per ton crushed, by amalgamation, 6.0205 dwts; by cyanide, 3.3594 dwts; by slags, 0.1149 dwts; total yield per ton (in fine gold) from all sources, 9.4948 dwts.

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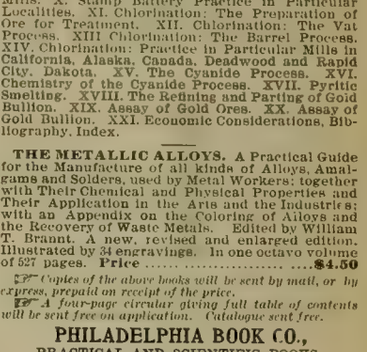

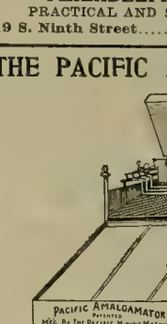

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Coast Industrial Notes.

—The first oysters raised for the market at San Pedro will soon be placed on sale.

—The Temescal, Cal., Water Company is about to assume a bond indebtedness of $175,000.

—El Cajon, San Diego county, has shipped twenty-nine carloads of raisins thus far this season.

—The Whitmore mill on Oregon Gulch mountain, Trinity county, has been destroyed by fire. Loss, $8000.

—Johnson, Halstead and McCabe, at El Cajon, San Diego county, have their drying-house filled with Havana tobacco. They will cut a second crop in about six weeks.

—A contract has been let for $100,000 for the extension of the government jetty at the mouth of San Diego harbor and one for $8000 for raising the levee near the mouth of the San Diego river.

—Joseph Sexton of Santa Barbara county has sold a carload of pampas plumes to be shipped East via the Southern Pacific and by water to Hamburg. There are sixty-seven cases in the shipment and 3000 plumes in each case.

—Raisin seeds contain about 16 per cent essential oil, and from 30 to 40 per cent of glycerine, the extraction of which has been found profitable in Germany. In view of this, Fresno, Cal., raisin growers are about to erect a raisin seed plant.

—The Visalia Land Office is of present interest to oil land claimants. Thousands of acres have been taken up under the law applying to mineral claims, but the Secretary of the Interior has decided that oil is not mineral and that the claims made are void.

—The annual report of the Southern Pacific Company for the year ending June 30, 1896, just filed with the Board of Railroad Commissioners, shows a comparatively small surplus from the year's operations, but the results are more satisfactory than those for the year ending June 30, 1895, which closed with a considerable deficit.

—In the oil industry of Los Angeles during October, 1895, there was a surplus of over 100,000 barrels of crude petroleum in the oil district, and nearly 30,000 barrels stored in tanks about the city and outside the field. Many wells were shut down because of a lack of tankage, and fuel oil sold as low as from 25 to 35 cents per barrel. Present quotations are $1.05 per barrel at the tanks. The present surplus is not over 55,000 barrels.

—The canal and locks at the Cascades of the Columbia in Oregon were opened for navigation November 5th. For the present they will be operated for the passage of boats only during the hours of daylight, and it may be necessary to still further limit their use to certain hours of the day, in order not to interfere too much with the work still in progress. The locks have been under construction for more than fifteen years, and the United States Government has expended about $3,000,000 on them.

—Seventy-four vessels formed the British Columbia fleet that went this year to hunt seals. The catch of 1896 will not total even 60,000, 20 per cent less than last year, which was regarded as an unsatisfactory season, and when the total catch was 74,124 skins, a drop from the total of 94,474 skins the year previous. Dividing this year's catch proportionately among the sixty-four vessels of the fleet, with their 800 white and 1118 native hunters, it would just about meet the cost of outfitting and wages, leaving nothing for the ship-owners who have invested their capital in this once profitable Pacific Coast industry.

—Reports come from Washington that the Chief of the Bureau of Yards and Docks, in his annual report to Secretary Herbert, makes a cut of two-thirds in the estimates for the maintenance and improvement of navy yards submitted by the various commandants. They asked for $6,996,620. He reduced the estimates to $2,245,043. Some of the principal items he indorsed are as follows: Mare island, Cal., quay wall, $30,000; dredging, $20,000; Puget Sound station, clearing work, $10,000; wharf, $60,000; officers' quarters, $12,000. The Chief also submits an estimate of $225,000 for suitable ways and sheds for laying up torpedo boats, but does not indicate location.

Recently Declared Mining Dividends.

Swansea, Utah, $5000, payable November 10.

Mammoth Mining Company of Utah, 5 cents per share, $20,000; November 2d.

The Le Roi Mining and Smelting Company, British Columbia, $25,000, payable October 28.

Anaconda Copper Mining Co., Montana, 5 per cent on a capitalization of $30,000,000, or $1,500,000, the profits of six months, payable November 1.

Ontario Mining Co., Park City, Utah, $15,000, payable November 4, a total of $13,325,000. This record has been surpassed only by the Calumet & Hecla.

Recent California Mining Incorporations.

Allender Gravel Mining Company, San Francisco; capital stock, $250,000, $625 subscribed,

Golden State Mining Company, San Francisco; capital stock, $300,000, all subscribed; H. and E. Lagan, C. B. McKinnon, G. P. Hall.

San Pedro Gold Mining Company, Vanderbilt; capital stock $1,000,000—D. McNamara, Vanderbilt, $250,000; C. K. Campbell, Vanderbilt, $500,000; J. D. Myers, Holton, $249,950; F. G. Janney, Salt Lake, $25; F. Williams, $25.

Personal.

J. Blair Shoenfelt of the Tortillata Mining Company in Shasta county has returned to his home in Douglass, Wyoming.

Ross E. Browne has returned from making an examination of gravel in the Fourmile district, Routt county, Colorado.

G. O. Laws of Junction City, Trinity county, has left for South America to superintend a placer mine for a Scotch company.

M. Provine has resigned after thirty-one years' continuous charge of the Empire mill, Grass Valley, Cal., an unusual term of such service.

Senor Carlos F. De Landro, a millionaire Mexican mine owner, is in Aspen, Colorado, inquiring into the approved process of treating ore.

Charles Gracey of Amador county has been appointed superintendent of the Southwestern Mining Company at El Dorado Canyon, Nevada.

Francis Muir of London, president of the De Lamar Mining Company, Limited, has been spending the week in De Lamar, Ida., looking over the company's property.

John M. Makwell of Leadville, Colorado, has been on the Klamath river, Siskiyou county, examining gravel mining property of the Princess Hydraulic Mining Company.

President Jordan, of Stanford University, left on Thursday for Washington, to present to the authorities there a statement of the condition of the seal fisheries in Behring's Sea.

H. A. Keller, consulting metallurgical engineer of the Mountain Mines, Limited, of Shasta county, has taken an office in the Crocker building and will make his headquarters here. He is directing the building of a second blast furnace for the mines.

J. W. Murphy, a well-known milling and mining man of the northwest, leaves next week for New Zealand, to take the management of the properties of the new mining company, the outcome of the Jay Hawk & Lone Pine Company, which is taking down its mills to transport to New Zealand.

J. B. Reinstein, a regent of the University and one of the trustees appointed by Mrs. Phœbe Hearst to arrange for carrying out her proposed gifts to the State University, left for the East on Tuesday to make arrangements for the international architectural competition in plans for buildings for the University.

Commercial Paragraph.

The Prospective Mining and Machinery Co., 127 First street, San Francisco, recently shipped a Tremain steam pump to C. C. Mathews, Tehachapi, Cal., for the Uncle Sam mine, and one to H. W. Russell, Mojave, for the South Park district, Inyo county.

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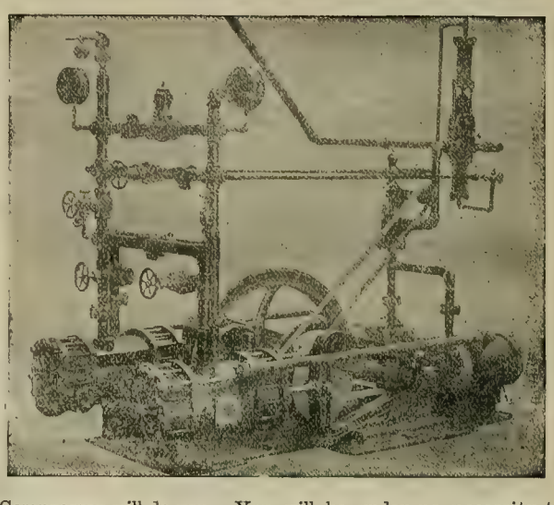

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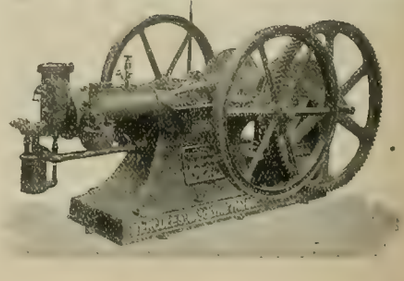

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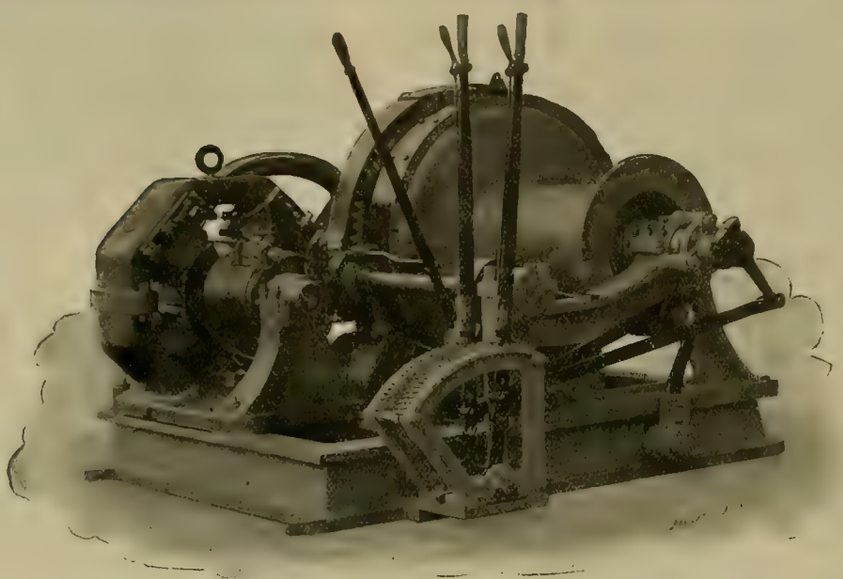

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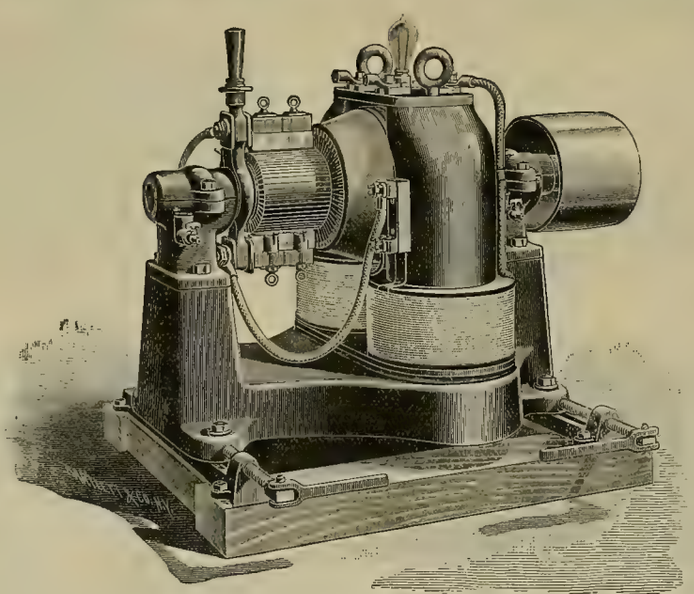

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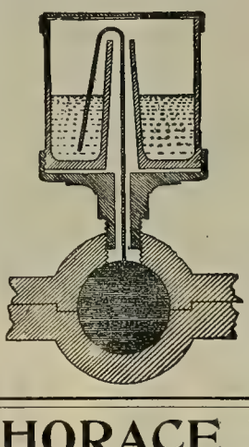
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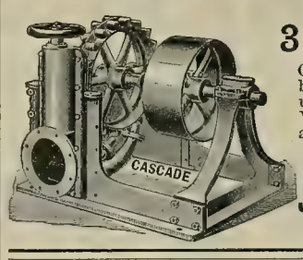

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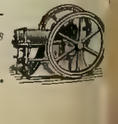

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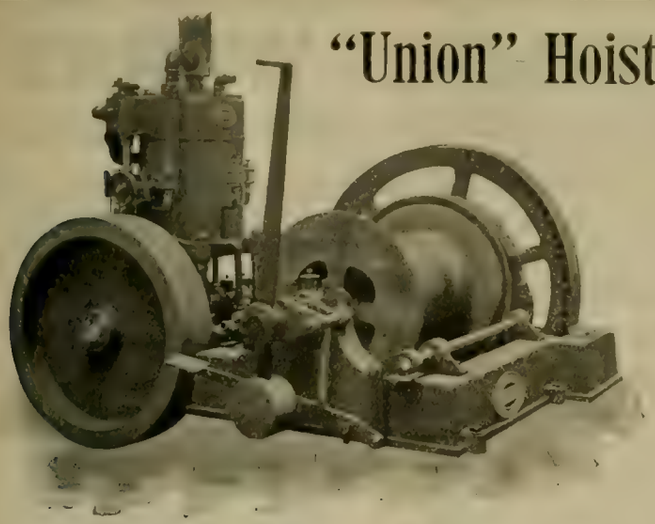

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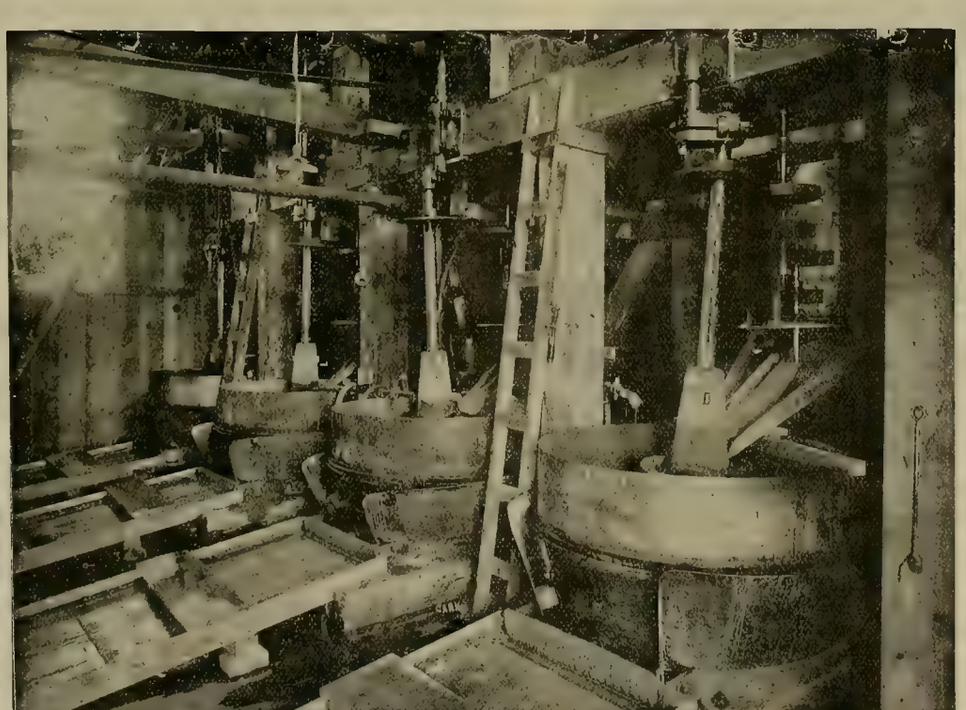

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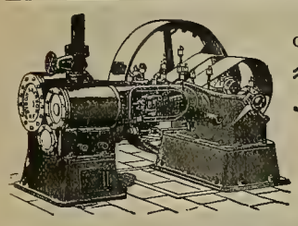

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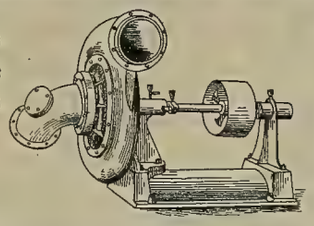

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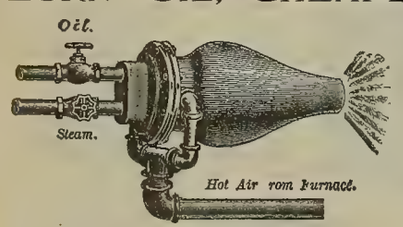

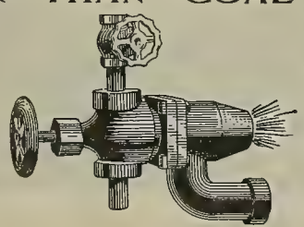

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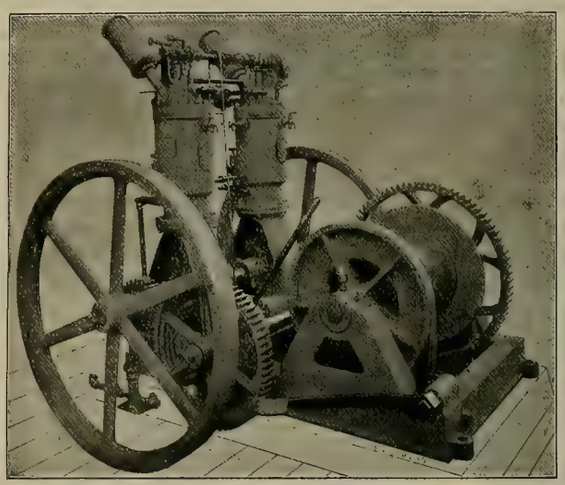

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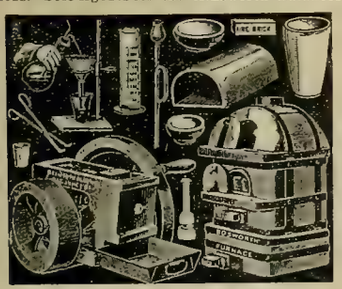

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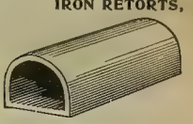

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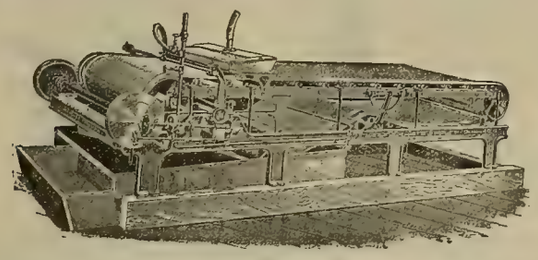

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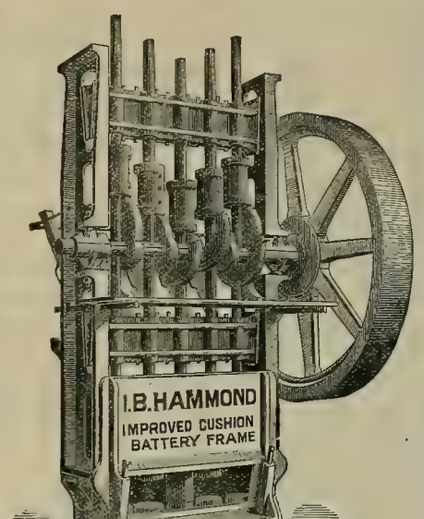

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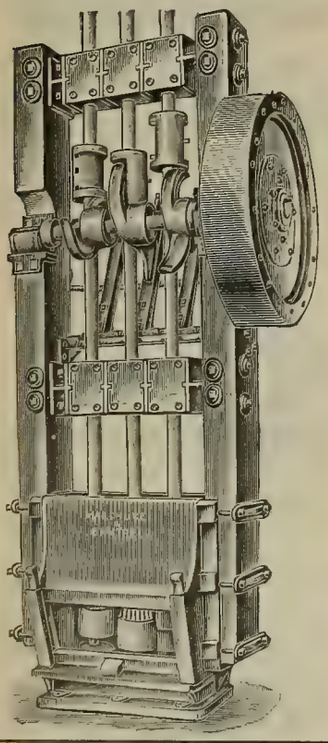

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Saves bill for heavy timbers, millwright and mechanics' labor, and a large amount of space. The term self-contained means a great deal for the mine owner, and can be readily recognized and appreciated in making an estimate for an ordinary plant when the comparative cost is considered.

FIRST: There is saved a large bill for heavy timbers, in many instances obtained at great expense and loss of time.

SECOND: The saving in millwright and mechanics' labor in framing and erecting.

THIRD: The large amount of space saved.

FOURTH: The great saving of freight,

Send for Circulars and Price List.

NOTICE TO ORE SHIPPERS.

By shipping your ores to us you can obtain the highest prices paid on competitive bids in the public market, together with a careful and accurate sample, as with our new mill and improved machinery we are able to give perfect satisfaction to all shippers. *Write for our Pocket Reference Book.* The highest cash price paid for gold bullion and old gold. Prompt returns.

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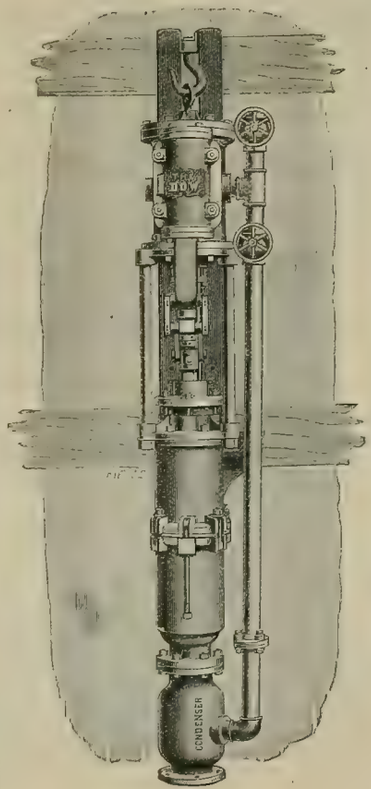
DOW STEAM PUMP WORKS,

OFFICE AND WORKS: 114 and 116 BEALE St., San Francisco.

MANUFACTURERS OF

Dow's Improved Steam Pumps,

SINGLE OR DUPLEX, FOR EVERY POSSIBLE DUTY.



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Artesian Well Engines,

Independent Air Pump and Condenser,

For Stationary Engines or Steam Pumps.

Power Pumping Machinery,

Speed Governors,

BALANCE VALVES AND PRESSURE REGULATORS FOR STEAM PUMPS,

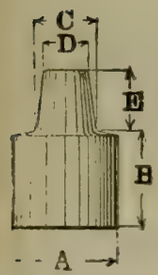
Etc., Etc.

Correspondence Solicited. Send for Catalogue.

RISDON IRON WORKS,

Office and Works: Cor. Beale and Howard Streets, San Francisco, Cal.

MINERS, ATTENTION!



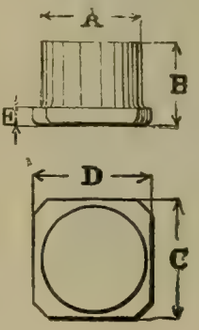
A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "

We beg to call attention to our "RISDON HAMMERED" Shoes and Dies, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



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When Writing please mention the MINING AND SCIENTIFIC PRESS.

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—MANUFACTURERS OF—

MINING AND MILLING MACHINERY,

Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines, Quartz Mills,
Manty Chili Mills, Rolls and Concentrating Machinery, Dodd Sigmoidal Water Wheel,
PUMPS--Cornish and Other, Copper and Lead Furnaces, All Classes of Marine Work.

SHIP BUILDERS. ★ BUILDERS OF U. S. WAR SHIPS. ★ HYDRAULIC LIFT DOCK.

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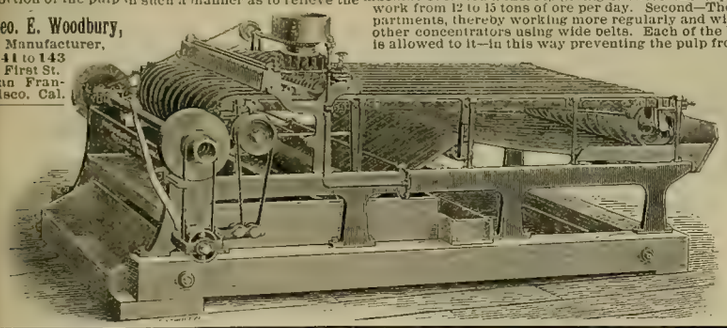
THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THIS CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of best Steel and Wrought Iron. Strong and durable. Price $575 f. o. b. Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS: First—The improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 12 to 15 tons of ore per day. Second—The machine equalizes the load by several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allowed to it—in this way preventing the pulp from running to the lower side of it, as is the case when a machine becomes out of level where wide belts are used. Third—The belts run on a perfect line, needing no adjustment to prevent their running from side to side, as in other concentrators. Fourth—The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth—The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth—The feed arrangement is perfect. Seventh—The machine is constructed of iron, with steel crank-shaft self-oiling boxes, and everything made in the most thorough manner, enabling it to run with very little attention or wear.

Geo. E. Woodbury, Manufacturer, 141 to 143 First St. San Francisco, Cal.



PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st prize at the World's Columbian Exposition 1893, and at the San Francisco Midwinter Fair, 1895.

THE GUTTA PERCHA AND RUBBER M'F'G CO.

30 and 32 FREMONT ST., SAN FRANCISCO.

Spadone's Concentrator Belts. Patented.

The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

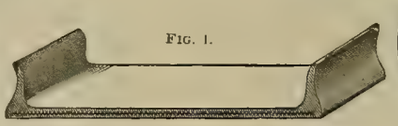


FIG. 1.

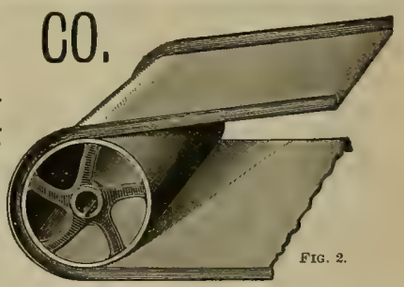
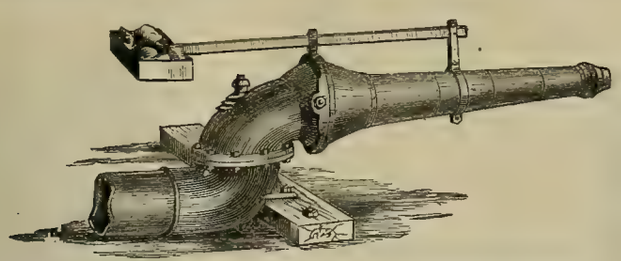


FIG. 2.

We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.

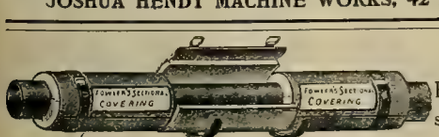
THE GUTTA PERCHA RUBBER AND M'F'G CO.
TELEPHONE, MAIN 1813.

IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture, and which are pronounced far superior to the SINGLE-JOINTED style. The latter, however, we furnish when requested. Prices, Discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent upon application.

JOSHUA HENDY MACHINE WORKS, 42 Fremont St., San Francisco.



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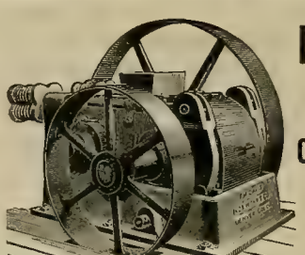

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—THE—

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Complete Plants for Ore Treatment

High Class Machinery and Experienced Modern Engineering.

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TRUAX Patent Improved

Automatic Ore Cars.

THEY ARE THE BEST AND CHEAPEST.

GEORGE E. WOODBURY, AGENT,

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Manhattan Arc Lamps, Life 100 Hours.

DIRECT AND ALTERNATING CURRENT.

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FOR ALL PURPOSES.

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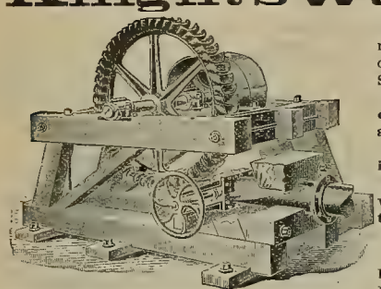
Knight's Water Wheel.



The accompanying cut shows the general arrangement of **Knight's Standard Water Wheel**, of which there are **hundreds in use** in different States of the Union.

These Wheels are made from **2 feet to 6 feet in diameter, from 10 to 1000-horse power, and adapted to all heads and purposes.**

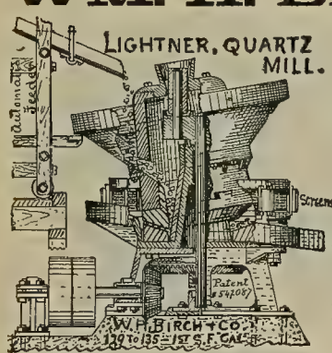
Wheels inclosed in iron cases, from 6 to 24 inches.

Wheels for electrical power can be furnished **with or without Governors. Highest regulation guaranteed.**

For full particulars, send for descriptive catalogue.

Address all communications to **KNIGHT & CO., Sutter Creek, Cal., or, RISDON IRON WORKS, Agents, San Francisco, Cal.**

WM. H. BIRCH & CO.



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2-Stamp Batteries, Self-Contained.
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BRODIE'S ROCK CRUSHERS, SAFETY CAGES, MINING HOISTS, ORE CARS and BUCKETS.

All kinds of Mining Machinery.

Agents Sioux City Corliss Engines. { HIGH GRADE. LOW PRICE.

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THE CHEAPEST PLACE ON EARTH TO OUTFIT A MINE

—IS AT—

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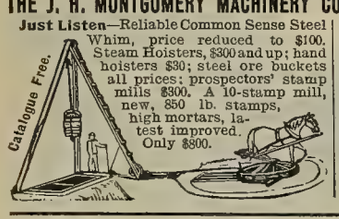
Just Listen—Reliable Common Sense Steel Whim, price reduced to $100. Steam Hoisters, $300 and up; hand hoisters $30; steel ore buckets all prices; prospectors' stamp mills $300. A 10-stamp mill, new, 850 lb. stamps, high mortars, latest improved. Only $800.



Ores tested and amalgamation and concentration mills built to **fit the ore** and guaranteed to save what we say. Coal Mine equipments, Screens, Jigs, Tramways, Arastors, Chilian Mills, Ore Sacks, etc., Cornish Rolls, 12x20, weight 6,000 lbs., price $350; Feeders, Bumping Tables; Blake Crushers, 7x10, weight 8,100 lbs., only $250. Our 100 page illustrated catalogue FREE.

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Rock Drilling, Air Compressing, Mining and Quarrying

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Mining Machinery.

Stamp Mills

Of the Latest Improved Design for

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VULCAN WIRE ROPEWAYS

For Conveying Ore, Etc.

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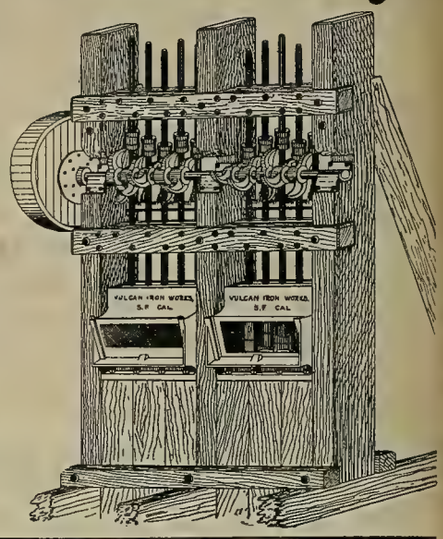
Cor. First and Mission Streets, San Francisco, Cal.



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A SUPERIOR ARTICLE AT A SMALL COST.

250 Square Feet, with Nails and Paint Complete.....$4.00

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THE OLD RELIABLE!

ALBANY

LUBRICATING COMPOUND

TWENTY-SEVEN YEARS' CONTINUOUS SERVICE in the great Mines, Steamships, Railroads and Mills all over the world prove it to be

THE KING OF LUBRICANTS!

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34-36 FREMONT ST., SAN FRANCISCO.
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DEALERS IN MACHINERY, OILS, MINING AND MILL SUPPLIES, ETC.

ADAMANTINE SHOES AND DIES

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CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

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Special attention given to the purchase of Mine and Mill Supplies.

Stamp Cam.

H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.

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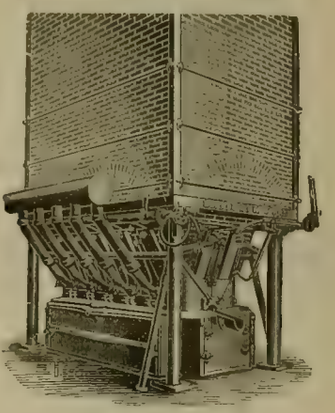
MANHATTAN RUBBER BELTING, PACKING AND HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.

THE FINLAYSON PATENT WIRE ROPE TRAMWAY.

THIS TRAMWAY IS THE BEST THAT HAS EVER BEEN PLACED ON THE MARKET. IT HAS NO RIVAL. IT IS STRICTLY AUTOMATIC AND ITS CAPACITY RUNS UP TO 1000 LBS. PER BUCKET. ANY ONE CONTEMPLATING THE ERECTION OF A TRAMWAY SHOULD INVESTIGATE ITS MERITS BEFORE PURCHASING ELSEWHERE. . . . . .

THE COLORADO IRON WORKS COMPANY, Denver, Colo.

SOLE AGENTS AND MANUFACTURERS.



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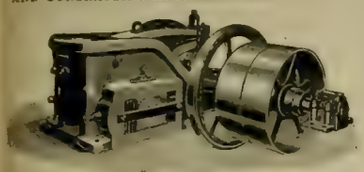
Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

WE ARE MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR **Gold, Silver, Lead, Copper and Pyritic SMELTING FURNACES.**

AMALGAMATION AND CONCENTRATION PLANTS.

Investigate Our Late Improvements in ORE CRUSHING MACHINERY.
We Guarantee Capacity Per Day to Any Degree of Fineness. . . . . .



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OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.

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Incorporated Under The Laws of New York.

Capital paid in.....$2,700,000.

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We use the following Cipher Codes at our Argentine Works: A. B. C. Code: Moreing & Neal's Code and Bedford McNeill's Code.

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Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps, Compressors, Hoists, Boilers, Etc., Etc.

REYNOLDS CORLISS ENGINES.

Work the Best! Prices the Lowest!

The Reliance Crushing Rolls.

The Best in the World!

RELIANCE WORKS.

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Chicago, Ill.	509 Home Ins. Building.
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New York City.	26 Cortlandt Street.
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Write for Our New Catalogue.

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SILVER-PLATED AMALGAMATED PLATES For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

San Francisco Novelty and Plating Works

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SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

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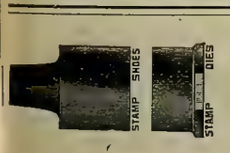
BATTERY SCREENS AND WIRE CLOTH.

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.



"Ferrite" and Projectile Steel Shoes and Dies.

Cheaper Than Cast Iron.

FOR FURTHER INFORMATION, ADDRESS

RIX COMPRESSED AIR MACHINERY COMPANY,

11 AND 13 FIRST STREET, SAN FRANCISCO, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 5, 1896.

There is a general sigh of relief that the election is of the past and for another four years we will be free from another exciting Presidential election. Already business is taking on new life, and, while buying is still on conservative lines, there seems to be a growing conviction that low prices, for a time at least, have seen their day. Manufacturers are increasing their output of goods, while importers of foreign goods have increased their orders. This is made necessary owing to the comparative light stocks carried by manufacturers, importers and the wholesale and retail trade. Press advices are to the effect that many enterprises held in abeyance until the result of the election is known will now be carried to fruition, not only at the East but also on this coast.

It is stated in financial circles that the large sums of money which had been withdrawn and hoarded will now come out for investment. This will have a favorable influence and cause a general easing in the rates of discount and a more general desire for investment. It is stated that the importation of gold from Europe will be continued for fully one month, so as to meet purchases of farm products and also American securities, provided prices continue up. In Europe the money markets are cabled active, with the rate of interest firm and steadily tending against borrowers. It is also cabled that the premium on gold is slightly higher.

New York Silver Prices.

NEW YORK, Nov. 5.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	29 15-16	64⅞
Saturday	30	65
Monday	30	65
Tuesday	30 3-16	
Wednesday	29 15-16	64½
Thursday	29 15-16	64½

	Copper.	Lead.	Iron.	Tin.
Friday	10 75	2 85	10 25@12 50	13 00
Saturday	10 75	2 85	10 25@13 00	13 00
Monday	.....	.....	.....	.....
Tuesday	10 75	2 85	10 25@13 50	12 05
Wednesday	10 75	2 85	10 25@13 50	13 05

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	8@8
New York Sight Draft	Par
New York Telegraphic Transfer	Par
London Bankers' 60 days	$4.82
London Merchants	$4.81½
London Sight Bankers	$4.85
Refined Silver, per oz., 1000 fine	64½
Mexican Dollars	50½@51½

SILVER.—The market here, at the East and abroad advanced slightly up to Tuesday. Yesterday, following the election, the markets weakened slightly, but neither in New York nor in this city did silver bullion sell below 64¼ cents. This information is given to us by bankers and bullion dealers, and is at variance with stock reports. To-day the markets are reported quiet but firm, owing to light stocks held here and at the East. The absence of much of a demand from India, owing to the small farm crops, and the limited demand from China offsets the reported reduced outturn of the mines. The last steamer for the Orient took out $152,620 in bullion for Hiogo.

MEXICAN DOLLARS.—The market is quiet at unchanged quotations. The last steamer for the Orient took out 67,823 dollars for Hong Kong and 50,000 for Singapore.

COPPER.—The market is slightly firmer, in sympathy with the East, where an improved feeling is reported to have set in. There is a good export movement from the Atlantic seaports and an increasing domestic demand.

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@16½

QUICKSILVER.—There is a good shipping demand both by sea and rail.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

LEAD.—The markets at the East are slightly stronger. Our market is reported firm.

Our market is quoted as follows:

Pig	—	@	3 60
Bar	—	@	3 95
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is a good seasonable demand.

Drop, sizes smaller than B, per bag of 25 lbs			$1 20
Drop, B and larger sizes,	"	"	1 45
Buck, Balls and Chilled, do,	"	"	1 45

ANTIMONY.—The demand is fair, with the market firmer at 7¾@8⅛c in a jobbing way. New York mail advices quote 7¼ for Cookson's, 6½c for Hallett's and 6⅝c for Japanese, from store.

BORAX.—There is a good outward movement to the East.

The market is quoted as follows:

Refined, in car lots	6½
Refined, in sacks	5¾
Powdered, in car lots	5¼
Concentrated, "	5⅝

TIN.—The markets for pig abroad and at the East are strong at higher prices. The advance is said to be due to heavy deliveries abroad. Tin plate is still slow.

Pig, per lb			13½c@ —
Plate, I C coke, heavy, per box	—	@	$4 05
" " " light, "	—	@	3 95

IRON.—The market is strong with a free consumption reported. Our New York mail advices report as follows: There is a growing disposition to compare prevailing conditions with those of 1879. Many flaws may be revealed in such a comparison, but the fact remains that business men are confident that 1897 is to be a good year. Pig iron has advanced at Philadelphia 25 cents per ton more and is up from 50 to 75 cents from the lowest. Plate mills are having the best demand. Sales agents at St. Louis have been advised not to make sales until after election, except at an advance of 25 cents a ton. Business at Cincinnati has been smaller than in recent weeks, partly because offerings have been withdrawn. There is no more free storage iron to be had at Pittsburg, and most furnaces ask $12 for delivery during the first quarter of next year. There is a good demand for iron at Birmingham and deliveries on maturing contracts are being made to the full extent of shipping facilities.

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 0
Gartsherrie	21 50	23 0
Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c	
Lake Superior Sheathing		20

POWDER.—The market is essentially unchanged.

The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, " "	8½c

COAL.—There is a firmer feeling for cargoes of Australian for shipment, owing to a scarcity of vessels, due to good wheat crop prospects and a disposition to remain at Australian ports in consequence. Our market for spot is steady. Freight rates from Europe are higher.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	—@ 5 00
Cannel	—@ 8 00
Egg, hard	—@11 50
Wallsend	—@ 6 00
Scotch Splint	—@— —
Brymbo	—@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—There is a continued good outward movement.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—There is a good demand. At a meeting of the directors of the Syndicate held at New York no change in prices were made and none is expected before December or January.

The market is quoted as follows:

Wire, carloads, basis per keg			$3 20
" jobbing, " "			3 30
Cut, carloads, " "			2 95
" jobbing, " "			3 05

Mining Share Market.

SAN FRANCISCO, Nov. 5, 1896.

Business on the two exchanges has been quiet, but notwithstanding which the market held firm. The impression prevails that with the election well out of the way and general business resuming its normal condition there ought to be more activity in the market, particularly in the shares of mines giving promise of the best results from work now underway. The attention of the trading public is largely centered on the Brunswick lode, owing to it not having been honeycombed through years of almost continuous work and therefore a strong probability of finding considerable ore. Comstock mining men are quite hopeful that something of importance will be discovered on that lode, not only in Chollar but also in another mine. Even if these expectations are realized it will take time and considerable work and expenditure of money before the ore could be placed in position for safe, quick and economical extracting. The work in several of the mines on the Comstock is being closely watched owing to some of it being in comparative new ground, so far as the public knows, but whether any more ore will be uncovered than has been for several years past is an open question.

The following mining companies had cash on hand November 1: Andes, $6,775; Alta, $5,043; Alpha Con., $7,303; Belcher, $13,733; Best & Belcher, $11,406; Bullion, $6,835; Bodie Con., $991; Bulwer Con., $8,775; Church, $10,957; Con. New York, $961; *Con. Cal. & Va., $12,525; Crown Point, $10,249; Chollar, $10,388; Confidence, $5,258; Challenge Con., $87; Con. Imperial, $2,713; Caledonia, $4,070; Exchequer, $1,016; Gould & Curry, $7,465; †*Hale & Norcross, $195; Julia Con., $23; ‡Lady Wash. Con., $32; §Mexican, $394; Mono, $1,251; ¶Occidental Con., $2,157; Ophir, $16,053; Overman, $499; Potosi, $9,423; Savage, $909; Sierra Nevada $18,746; Silver Hill, $564; Standard Con., $27,292; Syndicate, $640; Seg. Belcher, $159; Union Con., $16,597; Utah Con., $3,552.

*Of unsold bullion, with further shipments to come, and with indebtedness at bank of $2248 and the monthly expenses to be paid.

†In cash, and ore the coin value of which is estimated at $6000, to meet the monthly expenses and a note of $10,000 at the Bank of California.

‡Thirty-two cents, with an indebtedness of $510.

§With $500 due the bank.

¶In cash, with the monthly expenses and the company's note for $2500 due the Nevada Bank.

The Silver King Mining Company has an indebtedness of $658 and is collecting an assessment of 25 cents.

From the Brunswick lode mail advices continue, practically, without any change worthy of special mention. In the Con. Virginia, Best & Belcher and Gould & Curry shaft a station has been cut out on the 300-foot level, and active drifting north and south will be started soon. Exploiting work in Gould & Curry is under way from the tunnel level. In Savage they are still pushing the east crossdrift on the 300-foot level. As yet, nothing of importance has been run into. In Hale & Norcross they are sinking the winze in the footwall. At last advices it was down about 695 feet. The north drift on the 400-foot level in Hale & Norcross has reached the Savage line, but owing to a seepage of water a drain had to be put in place. The latter company will take up the work, while Hale & Norcross may run crossdrifts for the purpose of finding out if there is a body of ore near by. All indications are quite favorable. The east crossdrift on this level, near the Chollar line, is being pushed slowly ahead. It will have to be run, as reported, about 80 feet before they expect to strike the downward continuation of the ore found above. In Chollar the upraise from the 200-foot level is up over 150 feet. Connection will soon be made above. On the 300-foot level they are following a narrow streak of good ore, and at the same time extending the east crossdrift, which is out over 90 feet. On the 400-foot level they are advancing the south drift. In Occidental they are pushing exploiting work on two levels.

From the Comstock mines the news received the past week is essentially unchanged, although in some respects it grows more interesting in one or two mines in each group on the lode. In Utah exploiting work is fairly well under way on one of the levels. In Union and Sierra Nevada the work heretofore mentioned is practically unchanged as is the material encountered. In Mexican the west crossdrift on the 1000-foot level is said to be in favorable formation, as is the west crossdrift in the Ophir on the same level. In the latter mine the work to the west on the tunnel level continues to attract the attention of mining men. The work on the 1000-foot level continues in favorable formation, and when exploiting work is resumed it is thought that quite a body of ore may be run into. The east crossdrifts on the 1650-foot level are pushed slowly ahead. From the 1750-foot level they still extract ore, but the quantity raised and assay value were both less than past week. The Best & Belcher and Gould & Curry east crossdrift is being pushed slowly ahead without any material change in the formation run through. In Savage active work is well under way on the levels mentioned last week. The news is unimportant. In Hale & Norcross work is continued on the 900-foot and 1100-foot levels. In Chollar and Potosi the work is on the same levels as heretofore published. In Bullion they are still advancing the north drift. In Alpha they are slowly extending a west crossdrift. When the powers that be are ready, it is said that quite a body of ore can be uncovered to the west in the mine. In Con. Imperial fair progress is being made in the two west crossdrifts. From Challenge, Confidence, Yellow Jacket, Belcher and Seg. Belcher no news regarding work is allowed to be made public. Confidence, Belcher and Seg. Belcher continues extract and raise ore. In Crown Point exploiting work is being done on several levels. Several hundred tons of low grade gold ore is extracted and raised each week. In Overman and Alta the work is about the same as has been heretofore made public.

The following illustrates the changes of the week:

Mines.	Oct. 29.	Nov. 5.
Alpha	.....	.....
Alta Consolidated	.....	$ 10
Andes	$ 25	25
Belcher	53	.....
Best & Belcher	96	.....
Bodie	00	.....
Bullion	18	18
Challenge	39	.....
Chollar	2 00	1 95
Confidence	.....	.....
Consolidated California and Virginia	1 80	.....
Consolidated New York	.....	.....
Crown Point	45	43
Exchequer	.....	.....
Gould & Curry	73	72
Hale & Norcross	1 35	1 30
Justice	.....	.....
Mexican	44	48
Ophir	.....	1 35
Overman	.....	11
Potosi	79	84
Savage	45	63
Sierra Nevada	66	.....
Union	54	53
Utah	12	12
Yellow Jacket	50	49

San Francisco Stock Board Sales.

SAN FRANCISCO, November 5, 1896.

9:30 A. M. SESSION.

100 Bullion	18	100 Overman	11
500 Mexican	48	200 Potosi	84
100 Occidental	42	200 Utah	12
50 Ophir	1 35		

SECOND SESSION—2:30 P. M.

300 Mexican	45	200 Bullion	17
300 Gould & Curry	72	1500 Seg Belcher	05
50 Savage	63	100 Union	53
750 Chollar	1 95	100 Occidental	40
300 H. & N	1 30	100 Andes	25
50 Crown Point	43	100 Overman	11
350 Yellow Jacket	49	200 Alta	10
100 Savage	63	100 Potosi	79
300 Utah	11		

Gas Engine Mine Hoist.

The attention of visiting miners is called to the advertisement of the "Golden Gate" Gas Engine, to be seen on another page. The Engine and Hoist has been thoroughly tested under varying conditions all over the coast, giving excellent results and satisfaction in every instance. Adam Schilling & Sons are the manufacturers, at 212-214 Main street. They invite investigation at all times. *

Stop at a Hotel?

All right, then. The Brooklyn at 208 to 212 Bush street is just the place. Central location, light rooms, first-class table and low prices. The Brooklyn is managed by Charles Montgomery, the best known hotel man on the coast. That he runs it right goes without saying. *

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Challenge Con M Co	22	10c	Oct 14	Nov 17..Dec 8	C L McCoy, Mills Bldg
De Soto G M Co	1	7c	Sept 7	Oct 10..Nov 9	E H Clark, Mills Bldg
Goleta M Co	4	20c	Sept 21	Nov 2..Dec 2	D M Kent, 330 Pine
Greenwood G M Co, Cal	1	2c	Oct 16	Nov 23..Dec 14	Chas E Elliott, 309 Montgomery
Justice M Co	61	5c	Oct 14	Nov 17..Dec 8	R E Kelly, 309 Montgomery
Marguerite G M & M Co	4	20c	Sept 21	Nov 10..Dec 15	Chas Peach, 237 12th
Mexican G & S M Co	55	20c	Oct 9	Nov 12..Dec 3	Chas E Elliott, Nevada Block
Minaret M & M Co	1	½c	Oct 9	Nov 15..Dec 1	Geo R Armstrong, 309 Montgomery
Montecito M Co	3	15c	Sept 21	Nov 2..Dec 2	D M Kent, 330 Pine
North Gould & Curry, Nev	17	10c	Nov 4	Dec 5..Dec 23	C H Mason, 337 California
Potosi M Co, Nev	46	25c	Sept 28	Nov 4..Nov 24	Chas E Elliott, Nevada Block
Savage M Co	90	20c	Oct 2	Nov 4..Nov 24	E B Holmes, Nevada Block
Silver King M Co	15	25c	Oct 26	Dec 7..Jan 5	J W Pew, 310 Pine
Sterling M Co	3	15c	Sept 21	Nov 2..Dec 2	D M Kent, 330 Pine
Sumdum Chief M Co	1	15c	Sept 2	Oct 19..Nov 5	H G Stevenson, Hobart Bldg
Thorpe M Co, Cal	4	5c	Oct 14	Dec 12..Jan 9	A F Frey, 567 Market
Yellow Jacket S M Co	61	25c	Sept 11	Oct 15..Nov 20	W H Blauvelt, Mills Bldg

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Occidental Con M Co	Alfred K Durbrow, 309 Montgomery	Nov 16

THE SANTA ROSA GOLD MINING COMPANY.

Properties located in the Cripple Creek Gold Mining District.

We believe we can give you the largest prospective value for the least money.

Investigate carefully; hesitate before buying other stocks; consider SANTA ROSA and know why you don't want it.

Call, write or telegraph to F. H. PETTINGELL, 10-11 Bank Block, Colorado Springs, Colo.

ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Occidental Consolidated Mining Company will be held at the office of the Company, Room No. 69 Nevada Block, No. 309 Montgomery street, San Francisco, California, on MONDAY, the 16th day of November, 1896, at the hour of 1 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Friday, November 13, at 3 o'clock P. M.

ALFRED K. DURBROW, Secretary.

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Orders executed in large or small amounts for cash or on *reasonable* margins. Out-of-town orders by mail, telephone or telegraph will receive prompt attention. Daily market circular mailed free on application.

GOLD MINING PROPERTIES.

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

Every Miner Likes to Read This Paper.

The following illustrates the fact that every mining man, wherever he may be, reads the MINING AND SCIENTIFIC PRESS. It exemplifies the fact that thousands of progressive men weekly look with friendly interest for the arrival of this paper:

M. W. LOVERIDGE,
SUPERINTENDENT.

DUKE OF YORK HYDRAULIC MINING CO
ALBERNIE, VANCOUVER ISLAND, B. C.
October 25th, 1896.

MINING AND SCIENTIFIC PRESS,
San Francisco, Cal.

Enclosed please find P. O. order for $3.00 for one year's subscription. I have been a reader of your paper for over 20 years, and though not all of this time a personal subscriber, it has always been taken by several in the camps where I have been. I subscribed for the paper for some seven or eight years while I was in South America, and now here the same as while there, I find I can get more information in regard to what is going on in all the mines from the "Mining and Scientific Press" than I can from all the other papers I get. Yours truly,

M. W. LOVERIDGE.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCTOBER 27, 1896.

569,991.—NEWSPAPER WRAPPING MACHINE.—W. A. Beebe, King City, Cal.

570,431.—TAP GRINDING MACHINE—L. D. Biddle, Los Angeles, Cal.

570,198.—GATE—Della R. Burnham, Pullman, Wash.

570,086.—BEER GOVERNOR—J. D. De Gear, S. F.

570,385.—FRUIT PICKERS' BASKET—A. M. Denig, Riverside, Cal.

570,157.—TRIGONOMETRICAL ELUCIDATOR—R. H. Edmiston, Los Angeles, Cal.

570,402.—CAR FENDER—L. A. Hufschmidt, S. F.

570,407.—BABY CARRIAGE—J. A. Johnson, Hoquiam, Wash.

570,026.—DUST PAN—A. Koehler, Baker City, Or.

570,223.—WAVE POWER—F. G. Little, Portland, Or.

570,257.—THRESHER FEEDER—J. W. Livermore, Kingsbury, Cal.

570,330.—MINING MACHINE—E. Patterson, Oakland, Cal.

570,338.—CARD DRIER—N. H. Reed, Santa Barbara, Cal.

570,344.—TROLLING HOOK—A. H. Smith, Snoqualmie, Wash.

570,113.—CORK CABINET—Wilson & Neely, Wilbur, Wash.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FEEDER FOR THRASHING MACHINES.—John W. Livermore, Kingsburg, Cal. No. 570,257. Dated October 27, 1896. This invention relates to a mechanism for feeding unthrashed straw to thrashing cylinders of machines, which may be either stationary or applied to traveling harvesters. It consists of a smooth-faced cylinder journaled in front of the thrashing cylinder, with means for rotating it; a feeder belt adapted to deliver unthrashed straw above the feed and thrashing cylinders; an enclosed box or house within which the two cylinders rotate, and within which the discharge end of the feeder belt is contained; a flexible plate forming contact with the periphery of the feed cylinder and a corresponding inclined plate upon the front side, to prevent the straw from being carried behind the feed cylinder. Means are provided by which the feed cylinder is adjustable to or from the thrashing cylinder, as the character of the straw may require.

Every Inventor Wants a Good Patent

Or none at all. To secure the best patents Inventors have only to address DEWEY & Co., Pioneer Patent Agents, No. 220 Market St., San Francisco.

There are many good reasons why Pacific Coast Inventors should patronize this Home Agency.

It is the ablest, largest, best, most convenient, economical and speedy for all Pacific Coast patrons.

It is the oldest on this side of the American continent, most experienced, and in every way reliable.

Conducted from 1863 by its present owners (A. T. Dewey, W. B. Ewer and Geo. H. Strong), this agency has the best knowledge of patents already issued and of the state of the arts in all lines of inventions most common on this coast.

Patents secured in the United States, Canada, Mexico, all British colonies and provinces, England and other civilized countries throughout the globe.

Caveats filed, assignments duly prepared, examinations made, and a general Patent Agency business conducted.

Established and successfully and popularly conducted for nearly thirty years, our patrons number many thousands, to whom we refer with confidence, as men of influence and reliability. Old and new inventors are cordially offered the complimentary use of our library and free advice, etc. No other agency can afford Pacific States inventors half the advantages possessed by this old, well-tried and experienced firm.

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PRACTICAL

Assessment Notices.

CHALLENGE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 14th day of October, 1896, an assessment (No. 22) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 35, third floor Mills building, corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of November, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on TUESDAY, the 8th day of December, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. MCCOY, Secretary.

Office—Room 35, third floor Mills building, corner Bush and Montgomery streets, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 14th day of October, 1896, an assessment (No. 4) of five (5c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 567 Market street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of January, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—No 567 Market street, San Francisco, California.

GREENWOOD GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Greenwood, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 16th day of October, 1896, an assessment (No. 1) of two (2c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 79, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23rd day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 14th day of December, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. E. ELLIOT, Secretary.

Office—Room No. 79, Nevada Block, No. 309 Montgomery street, San Francisco, California.

GOLD RIDGE CONSOLIDATED MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 20th day of October, 1896, an assessment (No. 5) of two and one-half (2½c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 21st day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 14th day of December, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

WM. F. MCLAUGHLIN, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Brooklyn Hotel,

208-212 BUSH STREET,
SAN FRANCISCO, CAL.
Conducted on Both the European and American Plan.

This favorite Hotel, located in the best and most central portion of the city (being in the same block as the Mills Building and immediately adjoining both the Telephone Building and the First National Bank), is under the experienced management of CHAS. MONTGOMERY, and is as good, if not the best Family and Business Men's Hotel in San Francisco. Electric return call bells in rooms.

Board and Room per day $1.00 to $2.00.
Board and Room per week $6.00 to $12.00.
Single Rooms, 50 cts. to $1.00.
Family Rooms, $1.00 to $1.50.

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Miners, Attention!

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Dr. J. C. Anthony, of 86 and 87 Chronicle Building, who for the past four years has met with universal success in the cure of Ruptures, now guarantees a cure in from 10 to 16 days. There is no pain, no blood drawn and absolutely without danger. Usually but a single treatment required.

DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Cert.	No. Shares.	Amt.
E. C. Cain	170	2.500	50 00
E. C. Cain	171	2.500	50 00
C. L. Dingley, Jr	72	800	16 00
C. L. Dingley, Jr	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	169	3 803	76 06
E. C. Godfrey, Trustee	160	6.667	133 34
E. C. Godfrey, Trustee	166	1.333	26 64
E. C. Godfrey, Trustee	167	1.809	36 18
E. C. Godfrey, Trustee	141	1.667	33 34
E. C. Godfrey, Trustee	142	3.000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	83	2,000	40 00
J. F. R. Landis	138	1.000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6.000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2.500	50 00
Jos. A. Pratt	2	2.500	50 00
Jos. A. Pratt	3	2.500	50 00
Jos. A. Pratt	54	2.500	50 00
John E. Todd	5	2.500	50 00
John E. Todd	6	2.500	50 00
John E. Todd	9	2.500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until WEDNESDAY, October 21st, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California.

E. C. GODFREY, Secretary.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until MONDAY, November 16th, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California.

E. C. GODFREY, Secretary.

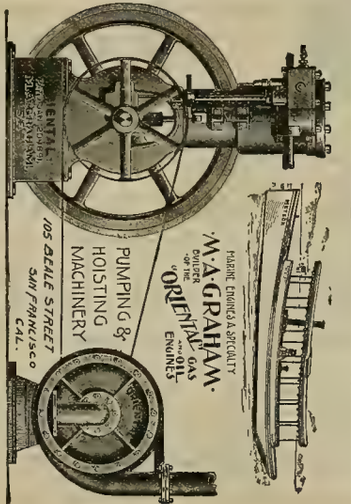
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Table of Contents:—Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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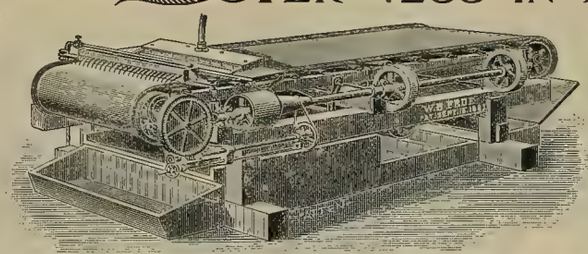

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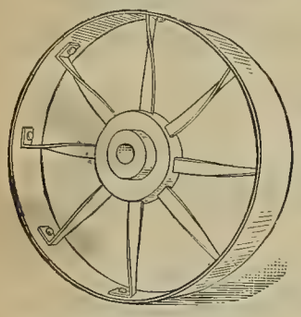

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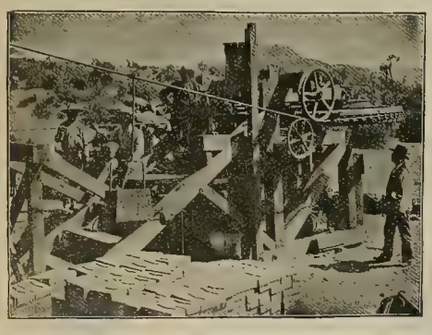

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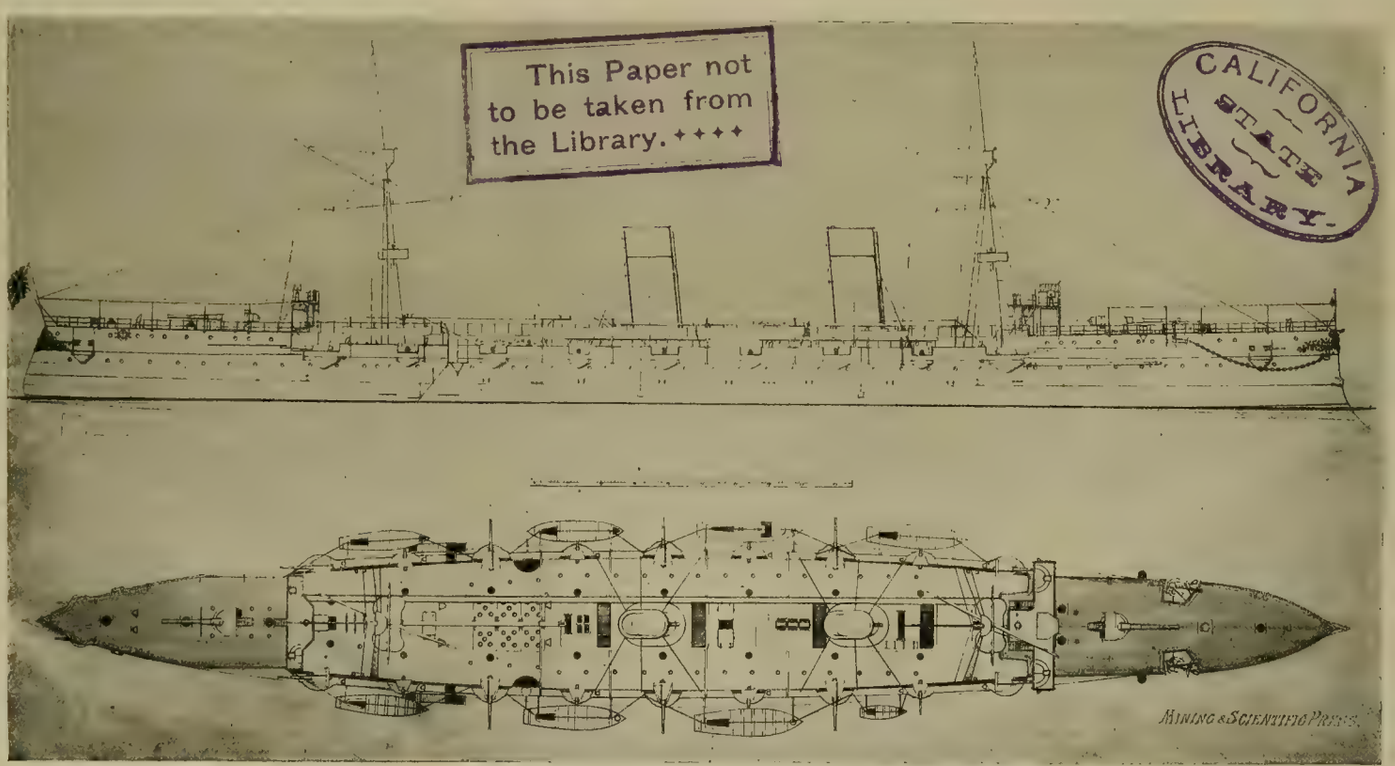
A Japanese Cruiser to be Built Here.

Herewith is an illustration that the MINING AND SCIENTIFIC PRESS has had prepared of the Japanese cruiser to be built by the Union Iron Works of this city. The upper part of the picture shows her lines and general appearance as completed: the lower part is a deck plan. The vessel will be a second class, high-speed, unarmored, protected cruiser, 405 feet 2 inches in length, 49 feet breadth, 17 feet 7¼ inches draft, 4760 tons burthen. Engines triple expansion, twin screw propellers, four double-ended and four single-ended boilers 14 feet 3 inches diameter. The armament will consist of two 8-inch 45-caliber quick-firing guns and twelve 12-centimeter guns, twelve 12-pound guns, and six 47-millimeter quick-firing guns: there will also be five torpedo launching tubes, one 14-inch fixed and four 14-inch training. The speed of the cruiser is to be 20½ knots an hour under normal draft and 22½ knots under forced draft. The securing of this contract is of industrial importance to the coast and the country. England and France competed for the work. This is the first contract of the kind secured here, and it is likely that other similar contracts will be secured after the Japanese Government sees what California can do in the way of producing a war vessel.



THE JAPANESE CRUISER TO BE BUILT BY THE UNION IRON WORKS.

A SOUTH AFRICAN CABLEGRAM says that the Pretoria court has declared void the MacArthur-Forrest patents for the recovery of gold by the cyanide patent. The long pending suit by Johannesburg mine owners against the company has thus been decided so far as the jurisdiction of the South African court is concerned. There was a similar contest some time ago in Mercur, Utah, which was finally compromised on terms understood to be favorable to the cyanide company. The decision, if correctly reported, will have considerable influence on the matter of royalties in every locality where the process is in use. The patentees never claimed that the solution of gold in cyanides is their original discovery, but claim that the direct application of cyanide in dilute solution for the extraction of gold and silver was an original discovery and patentable.

Oil Farmers.

A strong argument in favor of the bill we proposed in our issue of October 31st for presentation to Congress, amending Section 2329 of the Revised Statutes relating to placer claims, has been offered in Los Angeles. A decision from the Secretary of the Interior has been sent to the local United States Land Office on the contest by the Southern Pacific Company of an entry made by the Union Oil Company of California to the Central Oil Mine location in the Los Angeles land district. The land was included in a section made by the Southern Pacific Company, and the oil company contended that it should be excepted from the selection as mineral land. There was every justice in the claim. Under this decision the railroad companies may control a large amount of oil lands. Boring for oil, in the eyes of the Secretary of the Interior, may be an agricultural pursuit. Doubtless a Secretary of Mining would take a different view of the subject. This decision will naturally enlarge the grant to the railroad companies by limiting the right of the miner to ground containing metalliferous ores not in place, and is another evidence of usurpation of power by the Department as as it is really a grant of lands to them which Congress never intended that they should have. The theory of the law as expounded by the United States Supreme Court is that the Department has no right to grant public lands, but if this is not a grant by it of such lands what else can it be.

Yukon Placers.

The last of the miners who will come out of the Yukon country in Alaska this season have arrived at Port Townsend. The fact that such a large proportion of those who went into that country have returned without any gold is hardly apt to give the district a bad reputation in the eyes of mining men. That large quantities of gold have been discovered there can be no question, but a very small percentage of those who were lured into the country by the transportation companies obtained any of it. It is always more or less so in a rush to any newly discovered mining district. Attention, however, has been called to this case more than any other of late years, owing to the greater hardships that ensued. Fortunately, there has been less trouble in this way than was anticipated. But the experiences of those who have gone in without proper preparation have been a warning to others. The United States Geological Survey, it is to be hoped, will issue its report on the districts before the spring exodus begins. From present indications it would appear that there will be a large number going into the Yukon country again, but it is safe to predict that most of them will go better prepared to withstand hardships and to pay their own way in case of failure.

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J. F. HALLORAN.....General Manage

San Francisco, November 14, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—The Japanese Cruiser to Be Built by the Union Iron Works, 397.
EDITORIAL.—A Japanese Cruiser to Be Built Here; The MacArthur-Forrest Patents Declared Void by the Pretoria Court; Oil Farmers; Yukon Placers, 397. The Miners' Convention, 398-9.
SCIENTIFIC PROGRESS.—Compressed Air for Street Cars; A Great Kite Ascension; New Process for the Manufacture of Steel; Sanitation, 403.
ELECTRICAL PROGRESS.—Electric Tramway in Switzerland; A Bicycle Corps; New Process for the Direct Production of Iron and Steel from the Ore, 403.
MECHANICAL PROGRESS.—The Efficiency of Hydraulic Dredging; New Process for Joining Tubes; Compressed Air for Tenants; Percentage of Railway, 403.
PRACTICAL INFORMATION.—Of Interest to Inventors, 403. Wells in Canada; Returns of the Railway Systems in Europe, 404.
MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 406-7.
THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 414.
MISCELLANEOUS —Concentrates, 399. President Neff's Address-400-1. Report of the Committee on Legislation to the Convention; A. H. Ricketts on Proposed Legislation, 401. Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process, 402. Coast Industrial Notes; Personal; Recent California Mining Incorporations; Recently Declared Mining Dividends; Commercial Paragraphs; List of Delegates to the Miners' Convention, 405. Notices of Recent Patents, 408.

The Miners' Convention.

The fifth annual convention of the California Miners' Association has attracted more attention probably than any preceding meeting of the Association. There were gathered last Tuesday morning in Odd Fellows Hall nearly 500 delegates when the veteran president Hon. J. H. Neff called the convention to order with the following remarks:

Gentlemen of the Convention: I congratulate you and the cause of the mining industry upon this, the fifth assemblage of the annual convention of the California Miners' Association. I am pleased to see so many of you here. It assures me that the interest in this Association is not lagging or dropping, but it is increasing, and it only remains for us to be true to ourselves and true to the interests that we are advocating in order that the great mining industry of this coast may come to the fore, and, as it has been in the years past one of the leading industries, that it will continue the great prosperity of this State. (Applause.)

A Committee on Credentials, consisting of the following members, was then appointed: Judge Ira H. Reed, Calaveras, chairman; J. S. McBride, Nevada; E. C. Voorheis, Amador; E. C. Loftus, Tuolumne; Col. George Stone, San Francisco; T. J. Nichols, Placer; James O'Brien, Yuba; Col. N. E. Pickett, El Dorado; L. F. Byington, Sierra.

The convention then took a recess until 2 o'clock.

The convention re-assembled at 2 o'clock, when the Committee on Credentials reported the list of delegates properly accredited, which will be found on page 407.

President Neff thereupon delivered his annual address, which was frequently interrupted with applause, and at its conclusion three rousing cheers were given for Jake Neff of Placer. The address is published in full on other pages of this issue. Upon motion of Niles Searles of Nevada, 5000 copies of the address were ordered printed for general circulation.

Secretary Sonntag then read his report, which was as follows, with the exception of details as to receipts and expenditures:

Amount of money received from Oct. 16, '95, to Nov. 7, '96	$5,849 00
Amount expended from Oct. 16, '95, to Nov. 7, '96	5,311 11
Balance on deposit with Treasurer	$537 89

I am much pleased to note that the California Miners' Association is entirely out of debt, and the surplus on hand is ample to pay the expenses of the present convention. All the expenditures have been verified and audited by a member of the Finance Committee. Respectfully submitted,

JULIAN SONNTAG, Secretary.

A communication from the Northwestern Mining Association advocating co-operation to secure the establishment of a department of mines at Washington was read and referred to the Committee on Resolutions.

A telegram was read from Congressman-elect Marion De Vries regretting that he could not be present and asking that a copy of the proceedings be sent him.

Hon. Tirey L. Ford who had been the special representative of the Association in Washington last winter was called upon. He gave an account of the many difficulties that had been met with and of the good work he had accomplished. His remarks were frequently interrupted by applause. Mr. Ford then read the report of the Committee on Legislation of which he is chairman. The report is published in full in another column. It was adopted and placed on file on motion of Judge Walling of Nevada.

It was moved that the number of members of the committee on revision of the federal mining laws proposed in Mr. Ford's report be placed at seven to be appointed by the chairman, and it was so ordered. Judge Walling moved that the special report made by Mr. Ford be accepted, approved and placed on file, and that the gratitude of the convention be expressed to Mr. Ford for his very valuable services in its behalf, which was done, the convention rising to its feet and giving Mr. Ford three cheers.

John F. Kidder the State Debris Commissioner sent to the desk a letter from the Attorney General, answering one of his, as to the expenditure of the $250,000 appropriated by the State, and is as follows:

I am in receipt of your letter of the 16th instant, stating that the United States Debris Commission has received orders from Washington to locate and construct a dam for the impounding of debris already in the Yuba river, and that said commission wishes to know whether you are authorized to enter into a joint contract on behalf of the State of California for the construction of said dam, with the proviso that the contractor must look to the State Board of Examiners for the allowance of his monthly estimates.

I have given this matter very careful consideration, and I am of the opinion that you are not authorized to enter into any contract on behalf of the State jointly or otherwise for the construction of said dam for the impounding and restraining of debris. The act under which you hold your office and which prescribes your duties is entitled: an act to provide for the appointment, duties and compensation of a Debris Commissioner and to make an appropriation to be expended under his direction in the discharge of his duties as such commissioner. Section 3 of said act provides that whenever any board of inquiry of the United States Government shall have been appointed with power to adopt plans and specifications for the construction of works for the impounding of mining debris, it shall be the duty of said commissioner to consult and advise with such board of engineers of the United States Government to examine and pass upon the merits of such works, and said Debris Commissioner shall determine whether or not such works are calculated to and sufficient to protect the navigable water of the State, and to keep a record of such determinations. Section 4 of said act, after making an appropriation to be used in the construction of works for the restraining and impounding of mining debris, provides that "said moneys to be paid only upon orders to be drawn by the Controller upon the written request of the said Debris Commissioner, and to be drawn only for the payment of not more than one-half of the cost of construction of any such works restraining and impounding mining debris as shall have been approved by him and duly adopted and recommended by engineers of the United States Government appointed for that purpose."

These are the only duties presented by said act, and it is apparent that no authority is directly conferred upon the Debris Commissioner, nor is there any implied authority given to enter into any contract for the actual construction of the works. At the time the above act was approved and became a law, an act had been passed by Congress and approved by the President to create the California Debris Commission and regulate hydraulic mining in the State of California, which provided for the appointment of a commission to present plans and specifications of all work for the improvement and protection of the navigable streams of California, and to prevent the depositing of mining debris in said rivers and main tributaries thereof. In construing the act providing for the appointment and duties of the Debris Commission, it is apparent from the tenor of said act that the Legislature had in view the act of Congress above referred to and recognized the duty and authority conferred on the Commissioners by said act to build and construct such dams, etc., and it was the intention of said act of the Legislature of March 24, 1893, to make only an appropriation in aid of that provided by Congress and to provide for the appointment of a Commissioner whose sole duty should be to consult and advise in the adoption of plans and specifications for the construction of such works, and to see that such works when constructed should conform to the plans and specifications so adopted before any money should be drawn for the payment therefor.

The chairman in pursuance of a motion adopted appointed the following Committee on Resolutions: Fred Searles, E. A. Belcher, J. F. Halloran, J. M. Wright, Ira H. Reed, J. M. Clarken, George H. Burnham, S. J. Hendy and W. W. Montague.

The convention then adjourned until Wednesday morning at 10 o'clock.

On reassembling on Wednesday morning Col. C. L. Dignowitz of Salt Lake was given a seat in the convention as representing Utah. President Neff called Tirey L. Ford to the platform and then, on behalf of the members of the Executive Committee, presented him with a silver service set making some very complimentary remarks which were happily responded to by the recipient.

The committee's report on motion of Senator Voorheis was accepted, adopted and placed on file.

Govenor Budd, who had been invited to address the convention, being present, the president appointed Robert McMurray and Tirey L. Ford a committee to escort him to the platform. The Governor spoke as follows:

Mr. President and Members of Convention: I did not expect to have the pleasure of appearing before you to-day, though earnestly invited by your president and other members of the organization. I doubt whether I could have taken the time but for the fact that the Debris Commissioner, Mr. Kidder, a short time ago submitted to me the opinion of the Attorney General of California in regard to his duties as such Commissioner. I informed Mr. Kidder that he was mistaken as to the purport of the opinion of the Attorney General; the $250,000 that was appropriated by the Legislature of 1893 is in the State Treasury to-day and will be expended with the $250,000 appropriated by Congress at its last session. (Applause.) The Debris Commissioner's duties as defined by the opinion of the Attorney General, under the Act of 1893, are to supervise and approve the plans of the United States Engineers, and thereafter to see that the contracts for the construction of the restraining dams are properly carried out. He then reports, the matter comes on the Board of Examiners, who pass the bills; they go to the Controller and are paid by the State Treasurer. In my judgment there can be no question as to the effect of the law upon our statute book; there can be no question as to its expenditure, and if there is, it is very easy for the next Legislature to make the bill say exactly what the miners want it to say. (Applause.)

I am pleased after all these years to see accomplished that which has been attempted so often in the past. As a member of Congress I remember a bill was inherited by myself from my predecessor, and which I endeavored to pass, appropriating $500,000 for the very purpose of the joint appropriation today of Congress and the Legislature of this State. It was a bill championed then by Mr. Page, who was the miners' friend, and myself as his successor. Recently, when the bill came before Congress to appropriate $250,000, in investigating it and the laws upon our statute book I discovered, as I thought, that there would be a conflict between the two laws, and immediately I sent for Mr. J. J. Crawford, one of your members, Mr. Doolittle, another, and told them in the presence of my old friend, Dan Cole, that the result of the matter would be that you would have to change your act of Congress or you would lose your State appropriation. I knew from the law that such was the case. Mr. Cole and others called the attention of your Association to the fact. A telegram was sent by Judge Carpenter, Mr. Wright and others, and through the efforts of Mr. Ford the changes were made, so that to-day there is no conflict between the laws of the State and the United States upon the subject. (Applause.) It is needless to say that I got blistered as an enemy of the miners for ever having dared to say that there would be a conflict, but nevertheless I pointed it out, and I believe my pointing it out has resulted in some little good.

I know not what legislation may be needed, but two years ago, immediately after my election, in the Metropolitan Temple I was introduced by your good president, and then stated what I state now, that as Governor of this State any legislation proper—because you would not ask for other than proper legislation—to develop the mining industries of the State of California will not only receive my approval, but my hearty support, and all the energy that I can put behind the bill, (Applause) and two years from now when I have retired and become a private citizen, as I intend to become, because I shall not run again, I want you to understand distinctly that I will meet you here and call your attention to the fact that I have tried to do what I could for the miners of California. (Applause.)

At the conclusion of the address President Neff called for three cheers for the Governor, and the members of the convention rose and responded heartily.

The convention then took a recess until 2 o'clock.

Letters were read from Senator Stephen M. White and Congressman Loud regretting inability to be present and promising to do all in their power in Washington to secure the passage of the Mineral Land bill.

The letter from Labor Commissioner Fitzgerald was read, as follows:

I have noticed in the columns of the MINING AND SCIENTIFIC PRESS an article suggesting the necessity of the passage by our Legislature of an amendment to the present mechanics' lien law, so that the persons furnishing labor and materials in construction, development and improvement upon mining properties may be adequately protected. I therefore beg leave to state that during the last year many complaints have been filed with me based upon the loss of pay by miners who save not been properly protected, and I sincerely hope that some action may be taken by the Miners' Convention toward recommending an amendment of this character to the Legisature.

As the Miners' Convention represents the combined mining interests of our State I feel that such a recommendation will meet with the hearty approval of the legislators, and result in unmeasured benefit to those interested.

Trusting that the convention in its wisdom will undertake this action I have the honor to remain, Yours, very truly,

E. L. FITZGERALD, Labor Commissioner.

Harold W. Fairbanks of the State Mining Bureau read a paper upon the proposed division of the work of the bureau into a mining and a geological department, as suggested by J. J. Crawford, the State Mineralogist, in his annual report, and gave an interesting account of what had been accomplished and what could be done in the future for the good of the miner by a thorough geological survey of the State. A vote of thanks to Mr. Fairbanks was passed and 1000 copies of his paper were ordered printed.

Mark B. Kerr made some remarks in connection with the same subject, and particularly advocated a resolution, which was later adopted, in favor of topographic and geologic maps more in detail and more available to the miner.

President Neff stated that he wished to say a word as to those who were connected with the mineral exhibit of the Midwinter Fair and especially to thank the committee, which was composed of Professor S. B. Christy, Edward Coleman, Edward H. Benjamin, W. C. Ralston, Frank McLaughlin, J. J. Crawford and S. K. Thornton. Professor Christy, he said, was especially active in bringing out and exhibiting the mineral resources of the State.

W. C. Ralston, chairman of the Committee on the Preservation of Mineral Lands, reported that, owing to the failure to pass the Mineral Land bill, the committee had no duties to perform and no report to make.

The Committee on Resolutions presented the following report:

SAN FRANCISCO, Nov. 11, 1896.

To the President and Members of the California State Mining Association.—GENTLEMEN: Your Committee on Resolutions beg leave to respectfully report as follows. The following resolutions were adopted:

Resolved, That we look upon the State Mining Bureau as one of the important factors in the advancement of the mining industry of California and urge upon our Legislature the necessity of providing for its continued proper maintenance and support. The reports and bulletins are not only directly useful to the miners of the State, but also serve a good purpose in attracting the attention of people of other States and countries to the advantages to be gained in following the business of mining in California.

Resolved, That the president and vice-president of the Board of Trustees of the State Mining Bureau and the State Mineralogist and the professors of mining and geology in the University of California be made honorary members of this Association, and that they and each of them be entitled to seats as delegates to the present and future conventions of this Association.

Resolved, That the California Miners' Convention indorses the plan of having the State Mining Bureau co-operate with the United States Geological Survey to make a topographic and geologic map of the mineral regions of the State of Cali-

fornia, county by county, on a scale of 200 feet to one inch.

Resolved, That the California Miners' Association do urge upon the Legislature of this State, at its session commencing in January, 1897, the repeal of those certain acts, as follows, to-wit: 1. An act entitled "An act for the better protection of the stockholders in corporations formed under the laws of the State of California for the purpose of carrying on and conducting the business of mining," approved March 30, 1874, and relating, among other things, to the furnishing of verified weekly and monthly statements by the superintendent and monthly verified statements from the secretary and president of incorporated mining companies. 2. An act entitled "An act for the further protection of stockholders in mining companies," approved April 23, 1880, and preventing the directors of any mining corporation to sue, lease, mortgage or otherwise dispose of the whole or any part of the mining ground owned or held by such corporation, or to purchase or obtain in any way any additional mining ground unless such act be ratified by the holders of at least two-thirds of the capital stock of such corporation.

Resolved, That a committee of three, to be residents of San Francisco, be appointed by the president of this convention, the duties of which committee shall be to examine and carefully consider what legislation may be necessary for the benefit of the mining industry of this State, either in the way of amendments to existing laws or as new laws, and that said committee report to the incoming Legislature in writing, through the appropriate committees, with such recommendation as said committee may make: *Provided, however*, That all such proposed legislation shall first be submitted to the Executive Committee of the California State Miners' Association for their approval.

Resolved, That all persons having amendments to existing laws or new legislation in the mining industry of the State be invited to communicate with said committee.

Resolved, That the members of this convention make it their individual duty to advise and consult with the legislators of their respective counties, and urge upon them their friendly offices in behalf of such friendly mining legislation as may come before them for consideration.

WHEREAS, Transportation facilities are of paramount importance to the success of all mining enterprises; and

WHEREAS, The present road system of this State is entirely unsatisfactory and totally insufficient for the successful development of our mineral resources, therefore be it

Resolved, That this convention heartily indorse the movement for good roads, as evidenced by the creation of the State Road Commission, and we do ask for immediate legislation for the betterment of our public highways.

Resolved, That a committee of three be appointed whose duty it shall be to confer with the California Debris Commission, the State Debris Commissioner and the Attorney General in regard to the construction of the debris dam, said committee to be under the direction of the Executive Committee.

Resolved, That the thanks of this convention be and they hereby are extended to the members of the Congress of the United States who have aided the miners of California in efforts to secure needed Federal legislation.

Resolved, That the thanks of this convention be and they are bereby warmly expressed toward the newspapers of this State, and the newspapers of San Francisco in particular, and as well toward the people of San Francisco, for their hearty support and encouragement of this Association and its purposes.

Resolved, That a committee of three be appointed to consider and report upon the subject of a hospital for disabled miners.

Resolved, That the California Miners' Association strongly and urgently desires the appointment of a Cabinet officer to known as the Secretary of Mines and Mining.

Resolved, That, in the judgment of this Association, it would be desirable that the Governor of this State in appointing Regents of the University of California take into consideration the importance of the mining industry of this State and consider the advisability of appointing a competent miner as one of the Regents of that institution when opportunity offers.

The following is referred to the Legislative Committee of the California State Miners' Association:

Resolved, That the proposed legislation supplementary to the Federal mining law, concerning locations, etc., and also amending Section 14 of Article I of the State Constitution, and amendatory of certain provisions of the Codes of this State and also of the federal mining law, defining what shall be subject to placer entry, as follows, to-wit:

1. An act relating to the location, re-location, manner of recording lode and placer claims, mill sites, tunnel rights, amount of work necessary to hold possession of mining claims, and the rights of co-owners therein.

2. An act to amend Section 605 of the Penal Code of the State of California, relating to the removing, defacing or altering of land marks.

3. An act to amend an act entitled "An act supplementary to an act entitled 'an act concerning crimes and punishments,' passed April 16, 1850, amended March 20, 1872."

4. An act relating to the purchase of ores and other valuable mineral products.

5. An act to amend Section 1183 of the Code of Civil Procedure of the State of California, relating to the liens of mechanics and others upon real property.

6. Senate Constitutional Amendment No. ——: To propose to the people of the State of California an amendment of the Constitution of the State, amending Section 14 of Article I of the Constitution in relation to eminent domain.

7. An act to amend Section 2329 of the Revised Statues, relating to placer claims,

Be indorsed by the California Miners' Association in convention assembled, and, further,

Resolved, That a committee of three persons be appointed by the chairman to take all proper and necessary steps to secure the passage of said bill and the presentation of said constitutional amendment by the Legislature of this State at its session commencing on or about Jan. 4, 1897.

The communication of Attorney General Fitzgerald to State Debris Commissioner John F. Kidder is returned for the consideration of the convention. All of which is respectfully submitted. FRED SEARLES, Chairman.

J. F. HALLORAN, Sec'y.

On reassembling Congressman Barham addressed the convention and in the course of his remarks said that he believed that the Mineral Land bill would pass at the short session of Congress. He promised to do all he could for the mining industry.

A letter from Hugh Craig, president of the Chamber of Commerce, was read. He offered a suggestion that the University of California issue degrees to non-resident students upon passing required examinations, and that mining companies provide for an accident insurance for the working miners.

Nomination for president of the Association being called for Hon. Niles Searles, in placing upon the Convention the name of Mr. Neff, said in part:

The success of this organization and of this society is more due to the influence, to the good judgment, to the honesty and integrity of Jacob Hart Neff than any other one man. (Applause.) I know that he has served his probation and feels that he ought now to gracefully retire—he would not say so, but I will say—upon the laurels which he has so well won. But we are still upon the up-grade, and I feel as most of you feel that we still need him as the leader, that we still need him to handle the drill until we reach the dead level of success. (Great applause.)

Gentlemen of the Convention, I therefore nominate as the president of this society for the ensuing year Jacob Hart Neff. (Great applause.)

Mr. Neff was chosen by acclamation, the whole audience rising to their feet and giving three cheers.

Mr. Neff briefly addressed the Convention as follows:

Gentlemen of the convention, as has been well said by my distinguished friend, Judge Searles, I had ardently hoped that some other person might be selected to take charge of the Presidency of the Miners' Association. But I, standing here in the presence of this distinguished assemblage of miners, cannot find my heart hard enough to decline the honor that you now again confer upon me. (Applause.)

I have not been insensible in the past for the honors that I have received from the miners of this State, and as I look into the countenances of those who are here to-day it impresses me more firmly—I am convinced more firmly—that our work is progressing and passing on to eventual success. I am here as your servant to carry out your wishes, and so long as life endures, whether as your president or as humble follower in the ranks, I will be with you heart and soul, and my best efforts shall be used in the furtherance of the organization of which you are members. (Applause.)

I owe to my very distinguished friend, my old time friend, my thanks. I think his eulogy of me perhaps in some respects was somewhat overdrawn. I do not claim to be a first-class orator, nor a first-class presiding officer, but what I have done has been done to the best of my ability. What I have said usually comes from the heart. I feel what I say, and now while entering upon the discharge of my duties for another year I will pledge you my individual efforts for the furtherance of the objects of the Miners' Association of California. I thank you one and all for this testimonial of your regard. (Applause.)

Samuel K. Thornton was chosen by acclamation to succeed himself as Vice-President, as were W. W. Montague as Treasurer and Julian Sonntag as Secretary.

The President called upon Professor S. B. Christy of the State University to say something of the College of Mines at that institution. Mr. Christy said in part:

Mr. President and Members of the Miners' Association of California: A great many of the friends of the University of California have felt that the institution has been too modest in presenting its needs to the people of this State, and while modesty is universally recognized as no drawback in a man, still when it comes to institutions, particularly State institutions, there may be different views upon that subject.

One reason why the University of California should commend itself to all the citizens of this State is that it is endeavoring to educate producing citizens, and it seems to me that that is the one essential thing in the permanent success of any State.

I remember that General Barnes, some years since, made a very exhaustive investigation as to the condition of the working classes, in this city in particular, and he found that nearly all the workmen—the skilled as well as the unskilled workmen—were very largely foreigners, and that the native born young men were not very well represented among the working classes. The tendency in this direction has been noted for a long time by those who have at heart the welfare of this State.

I wish to call your attention to the fact that the University of California is doing what it can to offset this tendency. The old idea of a university was a place where nothing useful was taught, but the modern idea, the idea that Ezra S. Cornell first clearly enunciated, is a university is a place where anybody can learn anything.

I wish to call your attention to just one side of the work that naturally would interest this association most, namely, the one in which I am personally most interested. There are two sides to mining work, the one is the reduction of the ore, the other is the extraction of the ore. As to the first, we have been able to reach the practical side of it, through the munificence of the Legislature, which has allowed us to erect a well equipped stamp mill. We have a large number of machines which enable the young men to go through all the work of treating ore just exactly as it is done on a large scale. When it comes to mining work, however, it has been a very difficult problem, to know how the practical part of the work could be incorporated into a college course. I have, however, recently succeeded, I think, in making a successful attempt in this direction. For several years we have had a class practically instructive in one of the principal duties of the miners' task, namely, the attack of rock, the operation of drilling, of blasting, sharpening and tempering drills. All this work is now, and has been for some years, conducted in a practical way, and every man in the class is able to sharpen a drill, to harden and temper it, and then to use it. I think that all of you could see these young fellows at their work, cheerfully, could feel that there still was some hope that the young men of California might be able to procure their living by productive labor. (Applause.) I regard this simply as a beginning. I look to them putting in each of their summer vacations in the practical work of the mine. In this matter I have been ably seconded by a large number of members of this association, and scattered all through the State, the boys have been putting in their vacation, and I feel sure that so far as that side of the university work is concerned, you can count on its helping to make self-supporting citizens. (Applause).

Another thing that may possibly interest some here is a very brief announcement of some work in the mining department in the last four years, in regard to the cyanide process. A large field is open; a great many things are yet to be found, and we have already found a large number through the assistance of the students. It would take hours to enumerate the important and interesting things that have come up. I hope to soon have it in print. A number of new methods of precipitation have been discovered, and I will say in general that it seems to me not unlikely that the usefulness of this method may be extended largely beyond what has yet been reached: and this much is certain, that any mine owner who is discharging tailings averaging over 50 cents a pound would do well to save them. I know Mr. Edward Coleman said to me last night that he only wished he had the tailings that the Idaho mine had sent down the creek in the years gone by; that it would be a fortune to him. At that time there was no way known of saving any more gold than they did. How many other fortunes have gone down that might have been saved! It seems to me that, from now on, those in charge of mills ought to impound their tailings if they run anywhere over 50 cents per ton.

I want to say one word more. Is there a need for help at the University? There is a great one, and let me explain how the situation is. One of our professors, in the History Department, has recently compiled a number of statistics that are quite surprising. It shows that in nine years the attendance at the University has gone from 300 to 1500 students, 500 per cent in nine years; that the increase has been four times as great as the increase in the population of the State. The resources of the University have not grown in proportion. The income of the University is largely derived from a tax known as the one cent tax, which is a tax of one cent on the hundred dollars. This increase in nine years has been only 47 per cent. Our students have increased 500 per cent. In short, we are now attempting to do four times the work that we formerly did with the same amount of money. We are at every side pinched and cramped. We are crowded for room. To give one example; for a class of sixteen men, I wanted at least four forges; we only had one. We had to make the others ourselves out of wood and clay and stone. We need more anvils than one, and we had to take an old T rail, which the boys have been hammering on for the last two years. This is so in every department of the University. There is need for more money, need for more help

One word more and I am done. The Legislature will be appealed to, no doubt, to help us in this matter, in the way of an increased tax. What does this amount to? It has been calculated to amount to just the sum of 8 cents per year for each citizen in this State. Now, I say to you, gentlemen, generous miners of California, this is so little to you, and how much does it mean to untold numbers of young men and young women? Is it not a good investment? I remember Huxley stated some years ago that all the money that England had spent on the cause of education, from the time of Sir Isaac Newton down to the present, had been amply repaid by the education of one such man as Faraday. The electric lights that illuminate this building, the electric plants furnishing power to mines throughout this State, the numerous inventions that have glorified the end of this century, have all come from the brain of the man Faraday; they are all the evolving of ideas originating in his mind. So I think that what Huxley said is true: so I think that one such man as that to be reproduced from the University would amply repay all that we could give for a hundred years.

Col. C. L. Dignowitz of Salt Lake delivered an interesting address on the mineral resources of Utah.

Mr. Mason of Nevada stated that he had received a letter from Grove L. Johnson, in which he says that his sympathies were still with the miners and that he would work in their behalf in the coming session of Congress.

The chairman said that Senator Perkins was too ill to appear, but desired to express his unbounded confidence in the cause in which they were engaged and to say that he believed that they were just entering upon the most important epoch in the mining history of the State.

The chairman announced that the members of the Executive Committee and other important committees provided for by the convention would be appointed after the adjournment.

The committee to assist the secretary in formulating an address in communication to the various mining associations and organizations asking their assistance in securing the establishment of a Department of Mining at Washington, was amended as follows: Charles G. Yale, W. C. Ralston and S. K. Thornton.

President Neff then said:

Gentlemen of the Convention: I desire to again congratulate you upon the happy termination of this session of the Miners' Association. It has been one of the most successful, the most largely attended, and the most enthusiastic convention that we have ever held in this State, and it appears to me now that the cause is properly launched on the ocean of success, and that in the future we may greet each other as we have in this session, come together, legislate for the mining industry, and go home in peace.

A motion was made and duly seconded that the convention adjourn sine die, and was carried.

Concentrates.

H. W. FOWLER of Chicago will erect a large matte smelter just north of Ouray, Colorado. It is expected to be in operation early in the spring.

THE mill of the North Mountain Mining Company at Egan, in the White Pine district, Nevada, is treating fifty tons a day by the cyanide process.

THE Horsefly Mining Company, on the south fork of Quesnelle river, Cariboo, B. C., contemplate the abandonment of the hydraulic system because of the cemented character of the deposit, and propose to erect a 20-stamp mill next season.

THE total output of the Cripple Creek district from 1892 to 1895, inclusive, was $13,700,000. It is expected that this year's output will reach $10,000,000, making a total of $23,700,000. It is claimed that of this year's output $3,500,000 will be net profit to the owners.

AT a meeting of the Placer County Miners' Association, held at the Palace Hotel Nov. 11th, the following officers were elected to serve for the ensuing year: Hon. Harold T. Power, president; M. T. Lawrence, vice-president; Ivan H. Parker, secretary; T. J. Nichols, treasurer.

IT is claimed that the output of gold in the Black Hills will amount to $12,000,000 this year. There is no large mining district in the country that will not produce more gold than it did last year, and the total yield of the United States promises to far outstrip that of any other country.

W. T. GRISWOLD of the United States Geological Survey is in Salt Lake, where he will be joined by other members of the corps during the next few days, when they will go to the Tintic mining district, where a topographical survey will begin, to be followed by inquiries into economic conditions next spring.

THE smelter and sampling works at Salt Lake all report a falling off in the tonnage during October, and without improvement in the metal market a large number who are dependent on the mines and mills for a living must content themselves with short rations during the winter. The most notable diminution in the output is reported at Bingham, where for days not a single car of ore has been hauled out. Yet in few of the mineral fields has there been proved up so many valuable big properties during the past few months as in Utah. All the while the blocking out of ore goes forward at all the camps, and it is admitted that they are to-day capable of producing more under favorable conditions than ever before.

President Neff's Address.

The following is the address of President Neff to the State Miners' Convention:

Fellow Miners and Members of the Convention: This annual assemblage of the representatives of the mining industry of California, entirely unpolitical and non-partisan in its character, is one of great importance, not only to this State itself, but to all others where precious metal mining is carried on. Circumstances forced us to take the lead in California in forming the first Miners' Association in the United States, entirely free from all questions relating to labor troubles, or strikes or wages, and devoted solely to the general interests in mining and the remedying of such existing evils as were detrimental to the industry. It is true that the original purpose of the organization was to endeavor to rehabilitate mining in our own State, but it was soon realized that the objects of the Association must be broadened; and in so widening the scope of our work we were enabled to accomplish objects of benefit to all miners, whether pursuing their occupations in California or other States of the Union. In this way we were in a position to demand and receive the assistance before Congress of the representatives from other mining States, through which means more has been accomplished than had we carried on our work single-handed. Within the past two years another Miners' Association, similar to ours, has been placed on a working basis in the northwestern States, including Oregon, Washington and Idaho, and our fellow miners in those regions are prepared to co-operate with us and assist in carrying out any proposed measures. With the backing of the thousands of miners forming these associations we are in a position to receive a respectful hearing before Congress or Legislatures, with some reasonable expectation of having what we ask granted.

Before the formation of this Association the individual miner was left to his own resources. No matter how much cause of complaint he might have had or under what injustice he might be suffering, his single-handed efforts before the Courts, the Legislatures, the Land Offices or Congress, were scarcely heeded and he could accomplish nothing. One man fighting for relief from obnoxious laws or Department rulings, and demanding a change, would not be recognized as representing an industry; but when all of the class identified with that industry band together in a common cause, and, through these representatives demand relief, the Department, the Legislature and Congress itself *must* listen to their appeals and give consideration to their requests. Under these circumstances the American people, who are more powerful than these bodies of their own creation, will make themselves heard where the cause is just, as was ours, and their influence materially aids in the accomplishment of the desired ends.

Believing as I do in the future of this organization and its continued power for good to the mining industry, I have thought it proper to recite as briefly as may be some of the facts connected with its earlier history and formation, since I am familiar with them from the fact of having had what I consider the distinguished honor of having been chosen chairman of the first meeting in Placer county, where the start was made, and the first president of the resulting California Miners' Association. Being about to retire to the ranks and leave the leadership in abler and younger hands, it is well to call the attention of those of you who have swelled our ranks to thousands, from a mere corporal's guard, to the condition of affairs as it was when we began, and to those persons through whose early efforts this great Association was made possible.

In 1891, Thomas B. Everett, a Placer county miner, who, like some thousands of others, had been having hard times of it since the closing down of the hydraulic mines, suggested to J. A. Filcher, editor of the Auburn *Herald*, the idea of calling a miners' meeting at Auburn, with a view of holding a county miners' convention and ultimately one of the miners of the whole State to consider the condition of the hydraulic miners, and, if possible, afford them some relief. On the 18th of November, 1891, this meeting was held and resulted in the Placer County Miners' Convention at Auburn, November 28th, to prepare for a State convention to be held on January 20, 1892.

Among other things a committee was appointed to issue an address to the people of the State, calling attention to the deplorable condition of the mining industry and the measures of relief desired. This important committee consisted of Russell L. Dunn, Dr. M. Schnaeble, J. M. Fulweiler, Geo. H. Colby, J. B. Hobson, J. A. Filcher, J. H. Neff, Chas. G. Yale, Dr. N. Martin, D. W. Spear and Amos Stevens. After two days' work the address was issued for publication in the newspapers. It was an appeal to the people of California in behalf of the miners' cause and had the effect of creating a favorable impression, which was borne out by the results of the State convention.

The standing executive committee of Placer county was given full power to promulgate the call and make the arrangements for the State Convention. This committee consisted of Chas. G. Yale, John B. Hobson, B. F. Hartley, John Spaulding and myself. It so happened that Mr. Yale, who was at that time editor of the MINING AND SCIENTIFIC PRESS, was the only man from San Francisco who attended the Placer County Miners' Convention and he was placed upon the executive committee and entrusted with organizing the work in San Francisco. It was realized that, without the aid of the people and the press of the metropolis of California, little or nothing could be accomplished. It shows what the general feeling was at that time against hydraulic mining when it is stated that it was only with the greatest difficulty any one could be induced to take any leading part in the movement to rehabilitate it or give it any countenance whatever. Mr. Yale was greatly aided in his missionary work by Wm. C. Ralston, Robert McMurray, Thos. R. Church and a few others; but, though many promised support at the first meeting held to consider the subject, there were only sixteen men in this great city who attended or paid any attention to the matter. Just think of it, gentlemen! In a State founded on its gold mines, in a great city built by the gold mines, filled with millionaires and merchants who had made their fortunes in mining, only sixteen men could be found at that time who were willing to come forward and lend their names and influence toward rehabilitating a branch of the industry, fallen into decay through adverse judicial decision, and which had formerly poured ten millions of dollars in new gold annually into the channels of trade in this city. Here was an investment of one hundred million of dollars lying idle in our midst, unproductive, unused and valueless. We were not about to ask to recommence our operations on a former basis and permit our tailings to go where they would, into the rivers or on the farming lands. That time had passed, and no one recognized it more than ourselves. Poverty, distress, loss of property, litigation and bitter controversy were hard schools of experience, but had been ours. Idle men, deserted mining camps, crumbling ditches and reservoirs, rusted pipe lines, empty dwellings, abandoned diggings and the almost depopulation of what had been formerly prosperous mining sections, had brought despair to thousands throughout the mountains of California. Their only gleam of hope lay in a recently published report of a commission of Government engineers, the first favorable sign for years of the possibility of a resumption of operations in the hydraulic mining regions. They were about to meet together to ask the people of the city and the State for their assistance before Congress in favor of measures looking to the relief of this great industry, once so productive, now fallen into decay. And yet what a beggarly gathering in numbers was this first meeting in San Francisco to inaugurate such a movement. It is scarcely conceivable in the line of what followed and was discouraging in the extreme.

So bitter had been the controversy on the debris question and so long continued the litigation that a strong prejudice existed against the hydraulic miners, which was strengthened by their having lost the fight in the courts. The great opposing influence of the successful and powerful Anti-Debris Association of the valleys had fostered this prejudice and increased it. The growth in power and wealth of the agricultural industries of the State and the decadence of the mining industry, due greatly to the enforced closing down of the mines, had caused many to throw their influence against the miners' side. The press was either actively opposed to the miner, or silent regarding him and his industry. Public opinion was not in his favor. It was thought that agriculture and horticulture had almost entirely supplanted the search for gold, and these were the reasons for the small success of our first efforts in San Francisco.

But those who had the work in hand were not dismayed. As one who was appointed a delegate from San Francisco to the State convention declined or a few dropped aside others were chosen in their places until finally the full quota was obtained. In the mountains they were eager to come and no man refused, for they realized all there was at stake.

Finally, on January 20th, 1892, the first State Convention of the miners of California was held in San Francisco and was an overwhelming success. There was a complete revulsion of popular feeling. Even our old enemies, the valley men, held out a helping hand on becoming convinced of the sincerity of our intentions, and our desire to resume the mining work only where the conditions were such as to permit it being carried on without material injury to the navigable streams or the lands along the banks. The resolutions and memorial adopted by the convention were dignified and conservative, recognizing the rights of others as well as our own; and the speeches made by prominent men were of a nature to assure the public of the cessation of a long-continued controversy and an amicable settlement of existing differences. Care was taken in the appointment of the more important of the committees to select conservative men, and place upon them not only the miners, but representatives of the valley interests as well, that there should be full and free discussion of the subject and that both interests should have voice in our deliberations. That the course and policy were the best was proven by the results obtained. As an instance may be cited the case of the Committee on Memorial, charged with the duty of preparing a memorial to Congress, in which the hydraulic mining situation in California should be set forth and measures of relief suggested. This was the important committee of the convention; for, unless a memorial could be drawn which would be satisfactory to men of both mountain and valley, their differences could not be well adjusted at that time, and controversy instead of amity would result. This committee consisted of twenty-five members, miners and anti-debris men being both represented. After a long discussion of the facts involved, it was finally decided to select two men, one representing each interest, to draft this important document, and they were left by themselves to do this work, the rest of the committee retiring. Mr. Robert T. Devlin of Sacramento, the attorney of the Anti-Debris Association, was selected on the part of the farmers and Mr. Charles G. Yale of San Francisco to represent the miners of California. It was the first time in years that the representatives of these two contending factions had been brought together on friendly terms and with a common object in view. So amicably and well was the work performed that the committee reported favorably on the memorial at once, and the convention adopted it unanimously. It was the expression not only of the miners of California, but of the farmers as well, and formed the basis for the measures of relief enacted by Congress which once again set our ditches flowing, our giants spouting, opened our golden streams and rehabilitated the almost dying hydraulic mining industry of California.

Unity of action and fair-mindedness achieved a victory where individual effort, controversy and litigation had failed. Of almost equal importance was the Committee on Resolutions, which should tell the people of the State what our intentions and desires were and how we expected to accomplish our ends, and, moreover, another important committee was to arrange for the permanent organization of the California Miners' Association. I want to recall to you here present the names of the chairmen of these three representative committees of our first convention, because so much depended on their work and because they did it so well: Mr. C. W. Cross was the chairman of the Committee on Resolutions, Mr. Tirey L. Ford of the Committee on Permanent Organization and Mr. Charles G. Yale of the Committee on Memorial to Congress.

When our first convention adjourned and we organized the California Miners' Association, we at once realized that we had the assistance and moral support of the people and the press of the State. We were given a backing far beyond what was even expected. The Chamber of Commerce, the Board of Trade and Board of Supervisors of San Francisco passed resolutions endorsing our memorial and our object, as did the Boards of Supervisors throughout the interior counties. The merchants and manufacturers of this city were wonderfully liberal in their donations of needful money to carry on our work, and money came from other places as well. The different County Miners' Associations responed liberally to our call for financial help, and the California Miners' Association was fairly and successfully launched with public favor enlisted in its behalf.

For these results we are largely indebted to the press of this city and State, for had it not viewed our efforts with favor, we could not have gained popular approval. To the editors of California the miners of the State owe a debt of gratitude almost beyond measure. The MINING AND SCIENTIFIC PRESS, particularly, has always been our friend. And the miners are under heavy obligations, also, to certain gentlemen in this Association, who fought early and late in their behalf, without expectation or desire for reward. As your President, and a member of the various working committees, I know that our object could not have been carried out without their active and intelligent assistance. It would be impossible to name all who have been helpful to us in carrying on the executive work, or upon whose advice and assistance I have so largely depended. But prominent among them have been your secretaries, William C. Ralston and Julian Sonntag. Both of these gentlemen have performed a great amount of gratuitous work for the Association, for which we owe them our hearty thanks. Both have been enthusiastic in behalf of the cause and tireless in their efforts. We have had the best of legal talent to aid and counsel us in our labors—all without compensation of any kind—and I desire to return my sincere thanks to them for the many favors conferred on me as your President. During our early organization Mr. C. W. Cross gave us most material aid in many ways, suggested by his professional experience and knowledge relating to hydraulic mining and the litigation connected with it, and he continues to assist us to-day. Tirey L. Ford, as Chairman of the Committee on Legislation since we commenced our work, and as our representative before Congress at the last session, has been absolutely untiring in his zeal for the interest of the miners of the State. It is unnecessary for us to elaborate on his report and the valuable information it contains, for copies have been placed in the hands of each of you. Mr. Ford's individual work in our State Legislature has given us laws of the utmost importance to the hydraulic miner, and his advanced assistance has been freely given on all

occasions. Mr. A. H. Ricketts did a splendid work for us, as chairman of the Committee on Mineral Lands, as our attorney in Washington, and freely donated a large amount of his valuable time to our cause. Among other attorneys who have materially aided us with their gratuitous professional advice are J. M. Wright, E. A. Belcher, J. M. Walling and J. M. Fulweiler.

We should not forget ex-Governor Markham, who, as the Chief Executive of this State, first called the attention of the Legislature and the people of California to the deplorable condition of the hydraulic mining industry and suggested that measures of relief be instituted. The gentleman who acted as manager of our successful mineral exhibit at the Midwinter Fair—Mr. Edward H. Benjamin—also placed us under lasting obligation for the use of his name in the protests to prevent the railroad companies from patenting mineral lands.

In the early days, when we were struggling hard with the Caminetti act, Niles Searles, John Hobson and Robt. McMurray fought ably for us before the committees of Congress. In the collection of necessary funds, we have been greatly aided by Samuel K. Thornton, Louis Glass, W. W. Montague, Dan T. Cole and others. The Board of Trade of San Francisco, more than any other single body, has advanced our financial interests and helped bring light to many dark days with us. Among other active and tireless workers in our behalf have been John McMurray, Harold T. Power, Thomas R. Church, Edw. Coleman, Andrew Carrigan, S. B. Christy, S. J. Hendy, Chas. F. Hoffman, J. P. Parks, R. R. Grayson, E. C. Loftus, Henry Pichior, Felix Chappelet, R. C. Hart, E. W. Chapman, W. R. Thomas and James O'Brien.

I should be derelict in my duty did I not mention especially the very intelligent and constant services performed by one who is best known to us all as Charlie Yale. As one of the organizers of this movement in behalf of the miners of California, he has been one of my most valued assistants on the Executive and other important standing committees, has never faltered in his zeal, and never failed to do any amount of work for which we called upon him. With a thorough knowledge of the subjects before us, and a ready pen, he has not only greatly assisted us in the preparation of numerous important documents, resolutions, etc., but has ably fought our battles in the public press and helped to enlist its influence in our behalf. The conservative and successful policy carried out in the administration of our affairs is largely due to his advice, and method of bringing them before the public in the beginning. I freely acknowledge my own obligation for his valuable assistance in many ways and assure you he deserves the thanks of this Association of the miners of California.

I undertake to say that no organization has ever accomplished such important results with such small expenditure. No officer of the Association has received one dollar from the treasury for professional services, nor has any one else connected with the management of its affairs.

Being about to retire from the presidency of your Association, I have thought it my duty, as it is my pleasure, to recall to you the names of those more prominent in the conduct of its affairs in the past, since I have been in a position to see and recognize the services they have performed. I desire to return my sincere thanks to all of them for the many favors extended to me as your president, and thank them also in behalf of the Association to whose success they have so largely contributed. As to the future of this Association, I have every confidence in it. There are many measures which will be of benefit to the mining industry of the State which still demand consideration at your hands. Prominent among them are the needs of a representative of the mining industry in the councils of the nation, for there should be a Secretary of Mines in the Cabinet, that our large and growing interests should be guarded. Moreover, closer at home there should be in the State University, where there is already a College of Mines and Professors of Mining, one or more representatives of the mining interests in the Board of Regents. You should continue to lend your moral support and influence to the maintenance of the State Mining Bureau, which is now doing useful work in behalf of the mining industry of the State. This institution should be fostered and encouraged in every way by all of us. In Congress let us not falter or hesitate. Public opinion is with us in this matter and Congress has been "educated" on the question. The measure cannot fail of passage. We only ask that the railroad companies be prevented from acquiring any more mineral lands in this State, which were, by their land grant, expressly reserved for the miners. Other lands are given them, for such mineral tracts are set aside so they have no real cause of complaint. It is but just that the mineral lands, set aside as the domain for the miner and prospector, should be kept for them as intended, and it rests mainly with this Association to contest the false claims of the railroad companies, have the lands properly classified, and leave the mineral for the prospector of the future, for whom Congress plainly intended it. Numerous changes in the mining laws seem necessary for the protection of the miners' interests and the proper conduct of their business. All such proposed amendments should be carefully considered by your Committee on Legislation before receiving the indorsement of this Association in order that when our requests finally come before Congress they shall have been thought out and properly represent the desires of the miners of the State.

We are now in a better condition to accomplish our ends than ever before. The Association is out of debt, and though we have no available funds, they will doubtless be forthcoming when the necessity arises. The Mineral Lands bill which failed of passage at the last session of Congress is on file as "unfinished business" and will come up for consideration at the next session in December. It can surely be passed if our members in the House of Representatives will take the matter in hand promptly. The appropriation of two hundred and fifty thousand dollars by the State and of another two hundred and fifty thousand dollars by Congress are now available and being expended in the improvement of the rivers and the construction of dams to prevent further encroachment of the debris now in the streams upon the navigable portions. Many hydraulic mines are now being operated under the provisions of the Caminetti law, and their number is daily increasing. We have now a State Debris Commission, which is co-operating with the Federal Commission in the conduct of the work of rehabilitating these mines. All these things are the direct results of the efforts of this Association.

I am sure that we ought to feel somewhat proud of the result of our efforts in behalf of our chosen industry. Our experience shows that it only needed united effort to accomplish what was at one time supposed to be almost impossible. The public and and the press, then misinformed, only needed to be intelligently told of the true condition of affairs and what was necessary to remedy them, when their sympathies were at once enlisted in our behalf and we received their active assistance and influence. And gentlemen, we have been true to our promises. We have so succeeded in conducting the hydraulic mining business as to work no injury to any man or any interest. We have asked for no radical changes in the law, but simply pressed the enforcement of those existing. Those for which we may ask in the future are simply such as experience shows are necessary for the progress of the mining industry. They will interfere with no one else's affairs in any way and only relate to methods of conducting our own business.

I have great faith in the future of the mining industry of California. This great industry is now advancing with rapid strides and increasing its products between two and three millions of dollars every year. Those noble mountains which overlook our great valleys and form the backbone of the State, are daily yielding their golden treasures to the enrichment of us all. More still remains hidden than has ever been taken out, and there is work for the sturdy miner for years to come. The blows of his pick will resound and re-echo through those grand old canyons and ravines long after all of us here present shall have passed from the scene of our labors. Let us hope that the work that we have accomplished, and what we are to do to-day, will bring results from which the miner of the future will derive a benefit, and cause him to pause in his work, and thank the Miners' Association of California for what it did in his behalf.

Report of the Committee on Legislation to the State Miners' Convention.

To the California Miners' Association—GENTLEMEN: Your Committee on Legislation begs leave to make the following report:

Your committee begs to refer to its report made to the Association upon the occasion of its last annual convention in October, 1895.

Since that time there has been no meeting of the Legislature of this State.

The Fifty-fourth Congress, however, met in regular session in December, 1895, and continued in session until June, 1896. Your committee, acting under instructions from the Association, presented to Congress four measures for the consideration of that body. These measures were:

1. A bill intended to reduce the penalties provided for in the so-called Caminetti act, being officially entitled: *A bill to amend an act entitled "An act to create the California Debris Commission and regulate hydraulic mining in the State of California," approved March 1, 1893, by amending section twenty-two thereof.*

2. A bill intended to amend the Federal mining laws, with particular reference to the manner of locating, holding and working mining claims, and the transfer of contests as to the agricultural or mineral character of land from the land offices to the local courts, being officially entitled: *A bill to amend chapter six of title thirty-two of the Revised Statutes, relating to mineral lands and mineral resources.*

3. A bill looking to the segregation of the unpatented mineral lands within the railroad land grants in California, locally known as the Mineral Lands bill, and officially entitled: *A bill to provide for the examination and classification of certain lands in the State of California.*

4. *A bill to appropriate money for the construction of works to impound mining debris, and thereby to protect the navigable streams of California.*

For an account of the action taken by Congress upon the above measures you are respectfully referred to the report rendered by your representative in Washington, under date of June 30, 1896, entitled: Report of Hon. Tirey L. Ford in relation to his services at Washington in 1896, in behalf of certain mining legislation, which has been printed for distribution among the members of the Association.

Your committee is of the opinion that, with proper efforts, the so-called Mineral Lands bill above referred to should become a law during the approaching session of Congress, which begins in December and ends in March next.

In addition to the work necessary to secure the final passage and approval of the Mineral Lands bill, your committee deems it advisable that whatever doubts now exist as to the availability of the appropriation made by the State of California through the Legislature of 1893, should be removed at the approaching session of our State Legislature in January next. The National Congress having made an unconditional appropriation which fairly meets the terms of our State appropriation, the State can now well afford to so amend the wording of its appropriation as to eliminate all conditions and contingencies therefrom. This to your committee appears to be of considerable importance, and should engage the earnest and immediate attention of the Association.

Your committee furthermore begs leave to renew its former suggestions, that our Federal mining laws should be so revised as to make them not only harmonious but in keeping with the changed conditions since their original enactment. In this behalf your committee begs leave to suggest that a work of such importance and magnitude should not be hastily undertaken nor left to the action of committees already overburdened with other work. Your committee therefore suggests that a special committee be appointed, to be known as the Committee Upon the Revision of the Federal Mining Laws, whose duty it shall be to thoroughly examine the mining laws of the United States and other mining countries, and to formulate and present to the Association at its next annual meeting a complete code of Federal mining laws, to be presented to Congress for action by that body. Respectfully submitted, TIREY L. FORD, Chairman.

The Committee on Legislation is composed of the following members: Tirey L. Ford, John M. Wright, E. A. Belcher, A. H. Ricketts, James S. Farraher, Grant I. Taggart, Ross E. Browne, W. W. Kellog, C. F. Hoffman, R. McMurray, D. G. Reid, Frank R. Wehe, Hugh Craig, T. J. Parsons and Edward Coleman.

San Francisco, November 10, 1896.

A. H. Ricketts on Proposed Legislation.

The following remarks were made at the State Miners' Convention by A. H. Ricketts in reference to the proposed new laws and amendments affecting mining:

Mr. President: The proposed legislation which has been presented to this convention for appropriate action, by the MINING AND SCIENTIFIC PRESS of this city, comprises six bills and one proposed amendment to the State Constitution. These bills relate to the following subjects:

1. An act relating to the location, relocation, manner of recording lode and placer claims, mill sites, tunnel rights, amount of work necessary to hold possession of mining claims and the rights of co-owners thereon.

2. An act relating to removing, defacing or altering land marks, and amending Sec. 605, Penal Code.

3. An act relating to the robbery of mines and reduction works, and amending the act of 1850.

4. An act relating to the purchase of ores.

5. An act relating to liens of mechanics and others upon real property, and amending Sec. 1183, C. C. P.

6. A constitutional amendment defining what shall be construed as public uses, and amending Sec. 14 of Art. I of the Constitution.

7. An act relating to and defining placer claims, and amending Sec. 2329 of the U. S. Revised Statutes.

California has paid less legislative attention to the wants of the miner than any mining State or Territory, although the Federal mining law contemplates that its provisions shall be supplemented by State and Territorial legislation, as well as by the local rules of miners. In other words, the Federal mining law is a mere skeleton, the body of which it intends shall be supplied by the miners of each mining district by regulations not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated governing the location, manner of working, amount of work necessary to hold possession of a mining claim subject to these requirements, viz.: The location must be distinctly marked on the ground so that its boundaries can be readily traced; that all records of mining claims made after the tenth day of May, 1872, shall contain the name or names of the locators, the date of the location and such a description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim.

All the mining States, except California and Nevada, and all the mining Territories have long since enacted general laws relating to the manner of locating and working mining claims. This not because of any doubt in the mind of the Legislature of the ability of the miners of each district to frame proper regulations governing this subject, but because of the confusion which necessarily arises from the fact that the laws of a district have no extra territorial effect, and there may be as many ways to locate a mining claim in a State as there are mining districts therein, unless regulated by a general law.

A general mining law of a State is always more accessible than district laws, is universal in its operation and operative until repealed, and so serves to give greater stability to the title of unpatented mining claims. For a local law must not only be established, but it must be *in force* at the time the location is made, and it is always a question of fact whether such regulation was or was not in force at any given time. If in force, the law is valid; if not, it is invalid.

In other words, says the Supreme Court of this

State, a local law does not, like a statute, acquire validity by its mere enactment, but from the customary acquiescence of the miners following its enactment.

The locator looks with tender regard upon his notice of location, both posted and recorded, and as one of the best evidences of his title; but in a very recent case the United States Supreme Court has held that no written instrument is necessary to create the location right, in the absence of State or district laws, and in another and almost as recent a case the same court held that where the rules and regulations of the district in which the location had been made had fallen into disuse and was not at the time of the location and for a long time prior thereto had not been in force and effect, there was no statutory enactment that notices should be recorded; and the Supreme Court of this State holds, and the weight of authority is to the effect, that recording a notice of location is not required by the Federal mining law, and, when not required by State or local laws, is unnecessary and useless if made. And the United States Circuit Court for this district has held that: "The custom to record, and the place of the record, to be binding, ought to be so well known, understood and recognized in the district that locators should have no reasonable ground for doubt what is required to make and preserve a valid location."

It is perhaps safe to say that fully one-half of all the recorded notices of location in this State would be held to be inadmissible as evidence of any fact under the rulings of the Courts, either because the local law has fallen into disuse or because the notices affect claims lying within no organized mining district.

A State law will correct this evil and make a recorded notice *prima facie* evidence of the facts therein contained. The Federal mining law provides that the location shall be so marked that its boundaries can be readily traced. But the character, size or position of such monuments is not prescribed. The Courts hold that, in the absence of local law, any marking on the ground by stakes, monuments, mounds and written notices, whereby the boundaries of the location can be readily traced, is sufficient, and the local requirements as to what is a sufficient marking differ in the various districts. For instance, in one district the marking of the center line may be sufficient and in another district center end and side line monuments and a monument at each corner of the claim may be necessary. In other words, two monuments with proper notices thereon may be all that is required in one district and in the adjoining district eight or nine monuments must be erected or placed to comply with the law.

Can the "nomadic prospector" familiarize himself with, and properly act upon, all these different laws in California when the Supreme Court holds that "the act of Congress authorizing the location of claims does not state any time within which the location must be completed? But it says the claim must be distinctly marked on the ground so that its boundaries can be readily traced"—which is one of the most essential requisites of a valid location. Much must depend upon the conformation of the ground sought to be located as to what will or what will not constitute a sufficient marking of the ground under the Federal law; and, in one sense at least, it is possible that no statutory enactment or local rule as to the number of monuments to be placed upon a location will more than fairly serve that purpose. Still, a substantial compliance with the statute concerning the marking of a claim may always be supplemented by further acts. If necessary, monuments may be built higher or be more numerous than the law requires, or lines may be brushed out from one post to another, and so on as the exigencies of the particular case may necessitate to fully comply with the Federal law.

The first bill, in numerical order, presented for your consideration provides for the posting, recording the location notice, the contents thereof, and the time within which those acts shall be performed, to-wit: ninety days from discovery; this gives the locator time in which to perfect his location. And there is no doubt the discoverer of a mineral vein should have a reasonable time after the discovery of his vein in which to complete his location embracing the same. Wherever there has been any legislation upon the subject the time given after the discovery in which to complete a mining location has exceeded twenty days. The discovery is to be evidenced by a ten-foot shaft, or its equivalent, sunk within said time. This last is a provision found in all the statutes similar to the one here proposed, and is contained in the laws of many of the districts, and is a proper requirement, as no valid location of a lode claim can be made until a "discovery" is made within the limits of the ground sought to be appropriated. This bill further provides how abandoned claims may be relocated, and how amended locations may be made. That a locator may have his claim surveyed by a duly authorized surveyor and the field notes thereof incorporated in his recorded notice, and the same shall be *prima facie* evidence of the facts therein stated. This provision enables the mine-owner to have his surface lines determined, obviates the danger of the shifting of monuments or the subsequent overlapping of his claim by adjoining mine-owners or junior locators. These are advantages only otherwise obtainable by an official survey of his claim in patent proceedings. That the value of a day's labor of eight hours in performing the annual assessment work shall be $3. That work may be done on any one or outside of contiguous claims worked under a general system if for the benefit of all the claims and if equal in value to that which would be required on all the claims if they were separate or independent. This last provision perhaps amplifies the Federal law (Sec. 2324) upon that subject, but it is sanctioned by the decisions of the United States Supreme Court and other courts of high dignity.

That an affidavit of annual expenditures may be filed with the County Recorder within sixty days after the performance of such work, and such affidavit shall be *prima facie* evidence of the performance of the labor or improvements or both made upon the claim. It is true that the act of 1891 touches upon this subject, but it is not the most lucid expression of legislative interest, and in some respects may be said to be *non sequitur*. The bill further provides for the "advertising out" of delinquent co-owners and the effect as evidence of the record of such proceedings. Also, that if payment is duly made after the proceedings have been instituted, how the cloud upon the title to the claim thus raised may be cleared by either voluntary or involuntary proceedings. The act of 1891 touches also upon this subject, but does not provide any means for removing the cloud upon the title as above indicated. The bill further provides the manner in which placer claims, mill sites and tunnel rights may be located, and, further, that all the provisions of the act shall be equally applicable to all classes of locations except where the requirements as to any one class is manifestly inapplicable to any other class.

The salient features of the bill have been briefly stated. The bill is made up from the laws of the different mining States and Territories; in places it also embodies the language of the courts and of the Land Department of the United States. The fact that the necessity for substantially similar laws has long since been recognized by legislative enactment in other mining communities is one of the strongest arguments that can be presented to you in its behalf.

The second bill, in numerical order, is a proposed amendment of Sec. 605 of the Penal Code, making it a misdemeanor to maliciously remove, deface or alter landmarks, particularly the location stakes or monuments of a mining claim.

The third bill is a proposed amendment of Sec. 1 of the act of 1850, amended in 1872, relating to the stealing of ores, gold dust, amalgam, quicksilver or concentrates.

Both of the two bills last mentioned amplify the existing laws upon the several subjects, broaden their scope and are intended to give additional protection to the mining industry in this State.

The same remarks are applicable to the fourth bill, which is entitled "An act relating to the purchase of ores," and is intended to repress an evil which exists to a greater or less extent in every mining camp. This bill provides a means for the identification of ores sold and the ascertainment of the name of the person who delivered the same or received the proceeds thereof. A similar statute prevails in Colorado.

The fifth bill is a proposed amendment of Sec. 1183 of the Code of Civil Procedure relating to liens of mechanics and others upon real property, and is intended to secure to the laboring miner a greater right than is afforded by the existing provisions of the law upon that subject. The most cursory reading of the present law will show its manifold deficiencies as to the miner's right of lien and the necessity for its enlargement. The Supreme Court's construction of this law has tended to emphasize its inherent defects, and the proposed amendment has been drawn in the light of its decisions.

The proposed amendment to Sec. 14 of Art. 1 of the Constitution defines what shall be construed as public uses, and is taken bodily from the act of 1895. In view of the publication in the MINING AND SCIENTIFIC PRESS of the 7th of the editorial headed "Eminent Domain in Mining," copies of which are before you, it would seem like a work of supererogation for me to say anything further as to the reason why this constitutional amendment appears to be a proper measure for your consideration.

The necessity for a congressional definition of what may be included in a placer location has been made evident by the recent ruling of the Commissioner of the General Land Office in the recent case of Aldritt vs. Northern Pacific R. R. Co., which has been so fully explained in an editorial in the MINING AND SCIENTIFIC PRESS in its issue of October 31st last.

A proposed amendment of Sec. 2329 of the United States Revised Statutes is submitted for your consideration. It simply defines as "placer" what the Land Department has held to be "placer" for about fifteen years before the Aldritt decision.

It is not assumed that these various matters are free from error, although great care has been taken in their preparation.

Since the publication of these bills, several very important amendments have been made thereto at the suggestion of the Alameda delegation, and it is hoped that this convention will likewise add to the efficiency of this proposed legislation. I now, on behalf of the mining industry of California, submit the matter for your consideration.

Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process.*

NUMBER II.

By H. VAN F. FURMAN, Denver, Colo.

Whether the ore requires roasting prior to leaching will depend principally upon the condition of the gold in it. If present as a telluride, the gold may be extracted from the raw ore by fine grinding and leaching with potassium cyanide; but the action of the solution on the tellurides is slow, and it may be more economical to subject the ore to a preliminary roast. Roasting presents two disadvantages: it materially increases the cost of treatment, and it is liable to result in the formation of salts detrimental to the subsequent leaching; for example, soluble sulphates, which decompose potassium cyanide. Unless the roasting is carefully conducted, gold may be lost by volatilization. This is especially the case with tellurides. On the other hand, many ores are rendered more porous by roasting, and thus the rate of percolation is increased and coarser particles can be leached.

The best strength of solution and the time of maceration and percolation are important points. The time required and the amount of cyanide consumed will depend largely upon the strength of the solution employed. For example, the time required with a 1 per cent solution will generally be much less than with a 0.25 per cent solution. On the other hand, for many ores the consumption of cyanide with a 1 per cent solution is so great that the process becomes commercially impracticable, while with dilute solutions the ore may possibly be treated with success. In this connection, mention may be made of the use of additional reagents, such as sodium peroxide, bromine, etc., which *are said* to facilitate the extraction in many cases. This is a mooted point, and the use of these reagents is objected to by some, as they have a tendency to increase largely the consumption of zinc, when zinc is the precipitant employed, and to foul the solution. According to the equation of Elsner,

$$4Au + 8KCN + O_2 + 2H_2O = 4KAu(CN)_2 + 4KOH,$$

oxygen, or an oxidizer, is essential to the solution of the gold. It would appear to the writer that the necessary oxygen can be obtained from the air at less cost, and quite as conveniently, as by the introduction of expensive reagents.

The amount of potassium cyanide required per ton of ore, including the amount which is destroyed during treatment, is a vital point. The character of the ore and its associated minerals will determine the consumption of cyanide.

The rate of percolation of the solution through the ore is a question of some importance. It would appear as if too much had been made of this point, as it is essential that the solution should remain in contact with the ore for a considerable time in order to insure a good extraction. On most ores the percolation will generally be quite as rapid as the necessary time of contact will permit.

A small quantity of the ore should be ground to 30-mesh, which is a suitable degree of fineness for the preliminary experiments. A sample is carefully cut out of this prepared pulp, ground to pass 100-mesh, and assayed for gold and silver in the usual manner.

A quantity of stock solution, containing 0.5 or 0.6 per cent of potassium cyanide, should be prepared. As this solution is liable to decomposition, it should be kept in a stoppered bottle, protected from the air and sunlight, and should be tested from time to time according to Test 6.

It is necessary that the water used in making up the stock solution should be quite pure. It should always be tested for impurities, for should it contain iron salts, magnesium sulphate, salts with an acid reaction, soluble sulphides, free carbonic acid, or sulphuric acid, they will decompose the potassium cyanide.

I.—DETERMINATION OF ACIDITY.

Should an ore be acid, the result will be decomposition of potassium cyanide unless this acidity is destroyed before the cyanide solution is added.

Soluble Acidity.—Agitate 10 grammes of the pulp for ten minutes with 50 c.c. of water; filter, and test the filtrate with litmus paper for acidity. Should acidity be shown, wash the ore until the washings no longer give an acid reaction when tested with litmus paper. Now titrate the total filtrate with deci-normal caustic soda solution, until the neutral point is obtained, using litmus as an indicator.

Latent Acidity.—Transfer the washed ore to a small porcelain evaporating dish; cover with water; add a measured excess of deci-normal caustic soda solution; stir and titrate the excess of soda with deci-normal acid solution. This gives the latent acidity.

*Transactions Am. Inst. M. E., September, 1896.

(To be Continued.)

Scientific Progress.

Compressed Air for Street Cars.

The Manhattan Elevated Railroad of New York has authorized an air-power company to place one of its motors on one of its lines to run on schedule time and to draw a train of five cars. If it should be a success in this trial the Manhattan Company will consider the use of air motors on the entire system. The compressed-air locomotive or motor is little more than a long, black cylinder, similar to the boiler of the present locomotive, with the cab at one end. There will be no smokestack, no tender and no dome. The only protuberances on the cylinder besides the cab will be the whistle and the sand-box. The air power company claims that it can draw loaded trains more rapidly, smoothly and safely than is done by the steam locomotive, and at a decrease in operating expense, and points to its cars now running on the 125th Street branch of the Third Avenue cable line, in New York City, as an example of what it can do. The company avers that the public and the railway officials are more than satisfied with the cars, and that it is only a question of time when compressed air will supersede steam, cable, electric and horse power on city street railways.

THE observers at the Blue Hill observatory have sent definite details of their great kite ascension of October 8, when records were made with their meteorograph at a height of 9,385 feet above a level. More than three miles of piano wire were paid out, the ascension beginning at 9:15 A. M. and ending at 9:05 P. M. The pull on wire was from twenty to fifty pounds at the start, and ranged from fifty to ninety-pounds at the highest point, after which it slowly decreased. The instrument entered and passed through the clouds, as shown by the record of very dry air above the clouds. The temperature fell from 46° at the hill to 20° at an altitude of 8,750 feet. The meteorograph record in ink on a revolving cylinder run by clockwork was the best yet obtainable. The lifting force consisted of seven Eddy and two Hargrave kites from 6 to 9 feet in diameter, and the ascension was managed by Clayton, Fergusson, and Sewatland of the observatory. The instrument was more than a mile high during three hours. This breaks all kite altitude records. The height, 9,385 feet, is about 1,000 feet less than two miles.—Scientific American.

A NEW PROCESS for the manufacture of steel, invented by B. Stockman of Manchester, England, is claimed to be a success. The process involves a combination of both the Bessemer and the open-hearth methods of manufacture, and it is a basic dephosphorizing system. The molten phosphoric iron is brought into contact, in a converter or similar vessel, with dephosphorizing agents—nitrate of soda, common salt and titanic iron sand being the chief ingredients—and, after a contact of only three minutes, the metalloids are practically eliminated. The metal is then poured into an open-hearth melting furnace, where it is treated for about two hours, during which time the dephosphorization and desulphurization are completed, and the carbon is added in the usual way, as spiegeleisen or ferro-manganese. The steel produced by this system has been tested by Kirkaldy of London and Nash of Sheffield, and the results are said to be satisfactory. It appears to be adapted to the production of steel of any degree of hardness, and, as it only occupies about 2½ to 2½ hours, it is comparatively inexpensive.

IN a recent lecture on what sanitation has done for human life, Prof. Brewer of Yale University said that no one doubts that human life has been prolonged by the application of science in the last fifty years. How much, mathematically, this amounts to, in years, in per cents, is an unanswerable question. We can never have the data in figures. Even if we had our vital statistics completed for that period, men would differ as to the relative value of the several factors in this problem. Our great cities would not exist—they could not exist—without the aids of science. We have had an ancient Egyptian and Greek and Roman civilizations, which were pagan, and later Christian civilization, and all were powerless to convert practices. Between the epidemics that raged from time to time and the high death rate in the best of years, the population of Europe, as a whole, probably scarcely increased at all for 1000 or 1200 years. This century came in without a single city in Christendom with a million of inhabitants. Paris had in 1800 but 548,000; London and its suburbs in 1801, 864,845. The other great English cities had less than 100,000. Great cities could not endure then. First, the people could not be fed. Then, most of the population had to be fed and food produced within twenty miles of the place of consumption. Science has now made it possible to transport food half way around the globe, and has discovered new methods of preservation as well. City population was not self-perpetuating. Man died off; the death rate was continually high, and from time to time there was death by pestilence. Even where there were sewers, they were to drain the ground of water rather than to carry away sewage. Now cities are made nearly as healthy as the country.

Electrical Progress.

AT Montreux, in Switzerland, the electric tramway gets its power from a very small stream, and from the old Roman town of Vevey to the mediæval castle of Chillon one may ride in a trolley car propelled by the power of an insignificant little stream. The capabilities of this general utilization of natural power are beginning to be understood everywhere, and with the appreciation of the possibilities of the best methods of long-distance transmission, the development of many mountain streams must surely come. There are innumerable streams which, while very small, are yet very high, and these can, with comparatively little difficulty be impounded and carried down many hundreds of feet, thus making up for their lack of volume by the great pressure readily obtainable, and, either by the use of electricity or compressed air, the power may be transmitted to many points of application with but little loss.

IT is proposed by the electrician of the St. Louis and Suburban Railway to establish and maintain a bicycle corps, the duties of which will be to answer calls and patrol certain sections of the road. A few days ago one of the line workers used a wheel, and the result of the experiment proved satisfactory. Where minor troubles develop one working electrician is generally enough to remove the fault. Where there is trouble at any point along the line the "hurry-up wagon" and three or four men are dispatched. Often several calls are received at the same time from different localities, and all of them cannot be answered at once. With a bicycle corps this difficulty would, in a measure, be overcome. Defects in overhead work would also be discovered before they developed trouble.

THE new process for the direct production of iron and steel from the ore, which is being introduced in Sweden by Dr. De Laval, is said to consist in mixing pulverized iron ore with carbon, probably in the form of pulverized peat, and subjecting the same in some form of a rotating cylinder to heat, after which it is brought into direct contact with an electric arc of immense power, which reduces the ore to metallic iron, says *Industries and Iron*. The melted iron then flows into a large and highly heated furnace, where it can either be manufactured directly into steel or cast in any suitable form for further treatment. Dr. De Laval commenced his experiments something like three years ago at Trollhattan. It is said that Dr. De Laval has purchased one side of the entire water power at Trollhattan, which is made up of four falls, yielding an aggregate horse power of from 60,000 to 70,000. He has also purchased at considerable expense very much larger water powers in the north of Sweden.

Mechanical Progress.

The Efficiency of Hydraulic Dredging.

The efficiency of a hydraulic dredge, considered as a machine for raising mud and earth, is very low; but, taking the total result and comparing it with other methods of doing the same work, it presents a great advantage. The efficiency of a good centrifugal pump for water is from 55 to 65 per cent under ordinary conditions; that of a dredging pump is necessarily somewhat less, being from 48 to 55.

Let us take, for example, the work done in pumping a mixture of 15 per cent of sand and 85 per cent of water against a head of 40 feet. We will assume, for the sake of calculation, that the pump has an 18-inch discharge, and that the velocity of flow is 10 feet per second. Now, the weight of such a mixture of mud and water per cubic foot will be 85 per cent of that of a cubic foot of water at 62½ pounds, equals 53.12 pounds, plus 15 per cent of that of a cubic foot of sand at 120 pounds equals 18 pounds, or a total of 71 pounds per cubic foot.

The discharge of the pump will be 1056 cubic feet per minute, and the foot-pounds of work done will be that due to 1056 cubic feet at 71 pounds per cubic foot, raised to a height of 40 feet. This is equal to 2,999,040 foot-pounds per minute, or, say, 90 horse power. At 50 per cent efficiency, the horse power required to drive the pump will be 180. From this it can be deduced that an engine of 180 horse power, requiring, say, three and a half tons of coal per ten hours, will dredge and elevate about 350 cubic yards of solid material per hour, 40 feet high, or 1000 cubic yards per ton of coal.

Now, a good dipper or grapple dredge, burning three and a half tons of coal per day, will dredge on an average 2000 cubic yards per ten hours, or, say, 570 cubic yards per ton of coal. The dipper dredge, however, simply picks the material up and puts it down again—either into a scow or on the bank, if it is near enough to reach. The hydraulic dredge, on the other hand, will deliver its output to a considerable distance and spread it evenly over the surface. It is safe to say that transporting and spreading the material is at least worth as much as dredging it, so that, on this basic, the work of the hydraulic dredge has double the economic value of other types which do not transport and spread. These figures are, of course, merely approximate and will vary greatly, according to circumstances; but they will serve to illustrate the difference between the types.

In general terms it may be said that the hydraulic dredge is adapted to work under conditions where the material is homogeneous, that is to say, free from large obstructions, and where a fluid or semi-fluid discharge can be provided for. This discharge may be at any distance up to a mile or more. By homogeneous material is meant sand, clay, earth, gravel, alluvial deposit, and, in fact, everything that does not contain large obstructions, such as boulders, roots or stumps, etc., and any material which can be disintegrated by plow or cutter. All such material is capable of being carried through a pipe, when mixed with from 60 to 90 per cent of water, the amount that can be carried in suspension depending on the distance, velocity of flow and character of material. Stones and other objects of considerable size can be washed through the pipe; in fact, any solids can be carried that will pass through the openings in the pump.

The form of pump commonly employed is the centrifugal. For dredging purposes this is made extra heavy: the internal passages should be large and free, and with curves of large radius. The interior of the pump is sometimes fitted with lining plates to take the wear and abrasion. This wear, however, is not great, and a well-designed dreding pump is about as durable as any other kind of dredging machine.—A. W. Robinson, in Cassier's Magazine.

CHARLES S. CROWDEN of Beeston, England, has devised a new process for joining tubes, or, as he terms it, "welding tubes by hydraulic power." With two tubes to join, one is made to fit into the other. The inside of the outer one is spirally grooved along the length of the proposed join. Water power is brought to bear inside the inner one. The water endeavors to burst it, but it merely succeeds in pressing it into the grooves of the outer tube, which form a kind of mould to which the inner tube is shaped. The inner tube is not only shaped to the grooving of the outer by the water pressure, but it is fixed to it. On the removal of the pressure the two tubes are indissolubly united, and the object is attained. It is claimed that by this process a bicycle frame can be "welded" in five minutes or less.

IN a building in New York City, which is let out in sections, compressed air is added to the list of conveniences at the service of tenants. An air compressor is placed in the engine room of the building, and air power will be supplied to all the tenants of the building who desire it. The compressor is run by steam, and compresses the air into an air receiver. The building is piped throughout, pipes being run up through the shaft and branches taken off at the floors. The plant has been put down by a company having large interests in compressed air apparatus, and is intended to demonstrate the number of uses to which compressed air can be put in ordinary business and domestic life.

NEW JERSEY now has 29.72 miles of railway to every 100 square miles of territory. This is a larger percentage of track to area than is contained in any other State. Massachusetts comes next, with 26.35; Pennsylvania next, with 21.67; Ohio, 21.13; Connecticut, 20.81; Rhode Island, 20.37. In the proportion of railroad mileage to inhabitants Arizona leads, there being 208.51 miles of railway to every 10,000 of population in that territory.

Practical Information.

Of Interest to Inventors.

All inventions are classified in the United States Patent Office. The present classification, revised January 1, 1895, contains 213 classes, subdivided into 6322 sub-classes. Persons desiring to inform themselves in regard to the state of the art in any line of invention can best do so by purchasing printed copies of the specifications and drawings of patents in the sub-class containing the invention, the number and class of which will be given upon application to the Commissioner of Patents at Washington. Those wishing to subscribe for the printed copies of specifications and drawings of future patents in any sub-class may do so by depositing any amount from five dollars upward, the sum depending upon the size of the sub-class. The copies will then be mailed to them weekly at the rate of three cents each, until the deposit shall have become exhausted, when notice will be duly sent for renewal of deposit if desired. Orders for specifications and drawings by classes should give the numbers as well as the titles of the class and sub-class. Orders for single patents should give the number and date of the patent and the name of the inventor. Drawings of all patents from earliest to present

date have been photolithographed, with few exceptions. The cost of copies of drawings with specifications, if printed, is five cents per copy. If the specification has not been printed an additional cost of ten cents per one hundred words of manuscript copy will be charged. For the convenience of persons ordering copies of patents, or of the *Official Gazette*, coupon orders, good for one drawing and printed specification or one number of the *Gazette*, are sold in quantities of twenty or multiples thereof at five cents each. These may be used singly, and are good until used. The *Official Gazette* contains a copy of all patents issued, and is published weekly at five dollars per year. All subscriptions must begin with January or July numbers. There are no club rates, no discount to dealers, no free sample copies, and all subscriptions must be paid in advance. All correspondence relating to the above should be addressed to the Commissioner of Patents, Washington, D. C.

THE annual report of A. Blue, Director of Mines for Canada, shows that last year the total number of wells in the Petrolea district was 6787, and in the Oil Springs field 3176, making a total of 9963. There have been vigorous developments in various fields since this report was compiled. Wells have been put down in Plympton township, in Bothwell, and on Pelee Island, and many new wells have been put down in the original field, so that to-day there are considerably over 10,000 wells in this oil field. The contract price for drilling a well in the Petrolea field is about $110, the oil being usually reached at 460 to 465 feet. Forty sets of tools were running last year in the territory, much greater activity being shown since the price of crude went up. One rig, working in daytime only, will complete a well in less than two weeks, and the average number of wells drilled is about eighty per month. About 100 wells are abandoned every year, but this is owing to local obstructions and not to failure of oil, it being found cheaper to drill a new well than to clean out an old one.

THE French Department of Public Works have collected returns of the railway systems in Europe at the end of 1895, which are classified as to length of line by countries as follows: Germany occupies the first place with 29,032 miles; France comes second with 25,130 miles; Russia third with 22,225 miles, and Great Britain fourth with 21,025 miles. The other countries come in this order, namely: Austria-Hungary, 19,312; Italy, 9,410; Spain, 7,533; Sweden, 6,097; Belgium, 3,838, and Switzerland, 2,208 miles of track.

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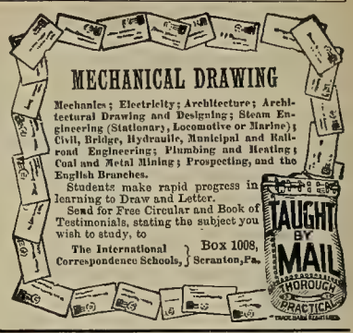
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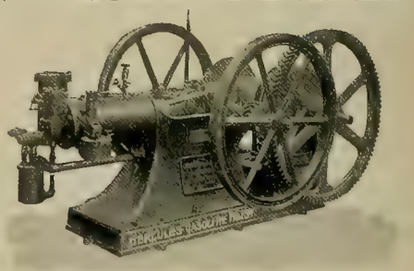

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Coast Industrial Notes.

—The telephone company is arranging to extend their lines and give direct communication between this city and San Diego.

—The Tulare Soda Factory and Bottling Works were destroyed by fire last Tuesday. The insurance was $1450 and the loss about $5000.

—A party of engineers has left Stockton to make preliminary surveys for a route for the Sierra Pacific Railway from that city to Sonora and other points in the mines.

—The San Francisco & Pacific Glass Works in this city, which has been idle for a long time, started up this week with 100 men employed. The force will soon be increased to 250.

—Word has been received from the East that the projectors of the Sacramento and Orangevale Railroad have determined to commence work immediately. It will be run by electricity and will tap the American river fruit district. The cost will be about $400,000.

—General Miles in his annual report to the Secretary of War recommends the following expenditures for high power guns, mortars and other artillery: at San Diego, $600,925; San Francisco, $902,850; mouth of the Columbia river, Oregon, $566,325; Puget Sound $764,050.

—The San Francisco Bridge Company's dredger Oakland has commenced work in Olympia harbor and will widen the channel so far as an expenditure of $32,000 will permit. The plans of improvement provide for a channel about 1000 feet from the north street bridge to deep water.

—The Northern Pacific Steamship Company announces that it has chartered the steamer Macduff to ply between Tacoma and Yokohama. This vessel was chartered to relieve the increased traffic from America to the Orient. The Macduff is a tramp steamer of 1882 tons registered, and is now at Hongkong.

—Work has been begun on the railway into Alum Rock Park from San Jose. The road will be extended about three-fourths of a mile and end near the bath houses, where a neat station will be erected. The work will cost about $10,000. In order to get into the park it will be necessary to construct a tunnel 338 feet in length.

—An organization has been incorporated under the name of the California Stone Brick Company, which proposes to expend $50,000 in the purchase of a site and the erection of buildings for the manufacture of bricks from sand. Plans for the kiln have been drawn and a search is now being made for a proper site in the neighborhood of San Francisco.

—A meeting will be held this evening in Sausalito to form a permanent organization whose objects will be the securing of a boulevard from San Rafael to Sausalito, the erection of milestones, the destruction of obnoxious weeds and the planting of trees and greensward on the sides of the county roads, besides other improvements for southern Marin.

—The committee of the California exhibitors of the Central American Exposition at Guatemala has organized, with Charles Bundschu chairman, E. R. Lilienthal treasurer and Carl H. Clark secretary pro tem., adding Mr. Pereira as official representative of the Guatemalan Exhibition committee. Mr. Clark has been instructed to draw up the necessary contract and interview the various merchants and manufacturers who had already signified their intention of exhibiting at the Guatemalan Exposition, as well as others who might be interested likewise.

Recent California Mining Incorporations.

Archimedes Gold Dredging Company, Marysville; A. C. Irwin, J. R. Garrett, S. O. Gunning, Marysville; R. H. and H. W. Postlethwaite, Saratoga; W. D. Goshard, San Jose; capital stock, $1,000,000; $80,000 subscribed.

Stine Mine and Milling Company, Los Angeles; F. Lindenfeld, J. A. Lovie, H. P. Von Der Lohe, J. D. Stine, N. T. Blair, Los Angeles; capital stock, $2,000,000; $77,500 subscribed.

Quartz Glenn Mining Company, San Francisco; George West, Frank A. West, W. T. Harris, John W. Ferris and Arthur W. Bell.

Triumph Mining Company, San Francisco; August Mackintosh, Kenneth Mackintosh and George H. Stipp.

The San Andreas Mining Company, San Francisco; John D. French, William Forsyth, Horace G. Platt, Benjamin H. Ramsdell and Mortimer Fleischbacker.

Personal.

GOVERNOR BUDD has appointed Miles Wallace of Madera commissioner of Yosemite Valley, vice George W. Sperry, resigned.

IVAN H. PARKER, the successful business manager of the Colfax, Cal., *Sentinel*, has bought the entire establishment and will continue to do good work for the miners of Placer county.

MR. GEO. F. KUTZ, who has been chief engineer at the United States Navy Yard at Mare Island for a generation and who recently retired after a long and honorable record, has taken the position of superintendent of marine engineering in the establishment of Chas. C. Moore & Co., 32 First street, San Francisco.

CHARLES F. HOFFMANN, who has been for many years manager of the Red Point drift mines in Placer county, owned by French capitalists, has accepted a three years' engagement in Siberia and will leave shortly accompanied by his son Ross Hoffmann. Mr. Hoffmann was prominently mentioned for the presidency of the California Miners' Association, until Mr. Neff consented to again accept the office.

EX-UNITED STATES SENATOR STEPHEN W. DORSEY has returned from London, where he went to interest capitalists in his plan to develop the mines at Picacho, and was successful. For several years the ex-senator's home has been in Denver, and for a year and a half past he has been interested in a large group of gold mines near the Colorado river, twenty-eight miles from Yuma, in southern California.

Recently Declared Mining Dividends.

Star King, Utah, Nov. 9, $37,500, payable Nov. 16, a total to date of $825,000, of which $375,000 has been paid this year.

Swansea, Utah, $5000, payable Nov. 10.

Mercur, Utah, $25,000, payable Nov. 20.

Galena, Utah, $5000, payable Nov. 20.

Utah, Utah, $2000, payable Nov. 16.

Commercial Paragraphs.

THE tunnel of the Pioneer mine, Placer county, Cal., is being driven ten feet daily. The power to run the drills is furnished by a Rix duplex 13x16-inch water-jacketed air compressor, built by the Fulton Engineering Works of San Francisco, and the working pressure at the drills is from 90 to 100 pounds.

THE Colorado Iron Works Company of Denver, Col., has issued a second edition of their pamphlet on "Ore Crushing Machinery," that will be of value to those interested in mills and smelters.

THE Prospective Mining and Machinery Co., 127 First street, San Francisco, recently shipped a Tremain steam stamp to C. C. Mathews, Tehachapi, Cal., for the Uncle Sam mine, and one to H. W. Russell, Mojave, for the South Park district, Inyo county.

THE CALIFORNIA DEBRIS COMMISSION, having received application to mine by the hyraulic process from William Konradi, in the Blackwater claim, near Spanish Ranch, Plumas Co., to deposit tailings behind the Quincy Mining & Water Company's impounding works in Spanish Creek; from Walter Shackleford, in the Grub Flat Mine, No. 2, near Meadow Valley, Plumas Co., to deposit tailings in Reservoir Ravine; from Pitro Picolo and Luigi Sulbrero, in the Cleveland Placer Mine, near Johnsville, Plumas Co., to deposit tailings in a ravine below the mine; from Francis Jackson in the Sebastapol Flat Claim, near Spanish Ranch, Plumas Co., to deposit tailings in an old pit; from La Mont Brown, in the Preacher's Ravine Placer Mine, near Scales, Sierra Co., to deposit tailings in Preacher's Ravine; from F. B. Clark, in the Clark and Willis Mine, near Railroad Flat, Calaveras Co., to deposit tailings in a ravine below the mine; from Charles Edner, in the Lady Edner Mine, near Omo Ranch, El Dorado Co., to deposit tailings in a ravine below the mine; from Em Santirfo, in the Santa Clara Mine, near Volcano, Amador Co., to deposit tailings in South Branch of Sutter Creek; and from Eckart & Solario, in the Campi Placer Mine, near Volcano, Amador Co., to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on November 16, 1896, at 1:30 P.M.

GOLD MINING PROPERTIES.

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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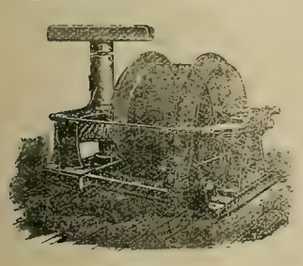

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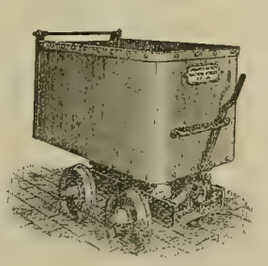

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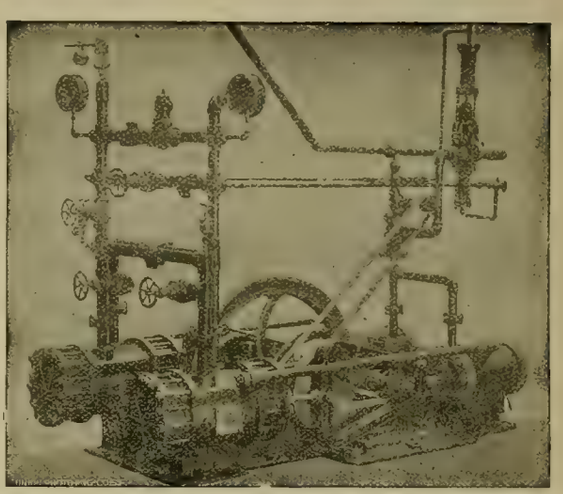

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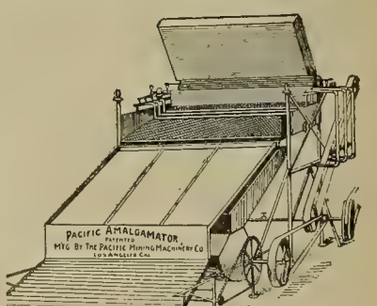
THE PACIFIC AMALGAMATOR



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Mining Summary.

CALIFORNIA.

Amador.

Record: The new pump has been started up at the Potazuba mine, and the water is being lowered in the old shaft at a rapid rate.

At the Allen mine J. B. White has begun the work of erecting the new 40-stamp mill. 160,000 feet of lumber and 2000 tons of machinery are already contracted for.

Ledger: Sinking was resumed in the Amador Queen mine on the 1st.

The mill at the Gwin is completed and will be running in full force by the 1st of December. Sinking is still progressing.

James Greenwood has taken out several tons of very valuable ore from the Clearwater which he expects to have treated at Selby's.

The Kennedy Mining Company is having a new hoist built over the north shaft.

The people in and around Campo Seco are jubilant over the prospect of the Venus becoming a successful mining enterprise.

The Plymouth Rock is being worked on half time. It is rumored that it has been sold to a large syndicate which intends to erect a smelting plant on the ground. It is claimed that the copper in the ore will pay expenses of mining and working.

Republican: The Wieland mine has started sinking again, having received the necessary hose in connection with the big pump. They intend also to keep on drifting east and west at the 400-foot level. Ten stamps are run day and night. Thirty stamps will be started as soon as they meet the gouge ledge at the 400-foot level.

Butte.

Mercury: Fifty men are at work in the Magalia mine. The Princess mine is being worked by eight men. The Indian Spring mine also employs eight men.

The English syndicate is putting in a large quantity of 16-inch iron pipe and is cleaning out and repairing ditches, so as to bring in a large quantity of water. This company is operating two mines—one on Mosquito creek, under the supervision of S. P. Moody, and the other on Butte creek, under the supervision of E. C. Paxton.

The Best mine, which has been idle for a number of years, is now being opened and will be operated again in a short time.

Mercury: The mill and reduction works of Ekman & Spangler are nearly ready for work. They expect to commence crushing ore from the Gillett, Rhiel & Co. mine of Palermo.

Calaveras.

Chronicle: The Lightner mine, adjoining the Utica on the west, is now in the hands of a company of large means, and work has been commenced thereon. It is the intention of the owners to put the main shaft down 1000 feet.

Work at the South Paloma mine has been suspended for a few days pending bids for sinking shaft.

J. Sargent has a small force of men at work grading for a mill site in the Gwin mine where it is his intention to erect a small mill and work the ore from his mine.

At the Petticoat mine active operations are going on. There is a substantial hoist on the mine, 40 feet high. The shaft, which is a double compartment one, 6x14, is now open to water level. A new building 24x36 has just been erected, which is to be used for an engine room. The machinery is now on the road.

At the Mitchell mine the tunnel is now in 450 feet. A 75-foot winze in face of drift shows 5 feet of galena ore that prospects well. An incline shaft is now being sunk at the mouth of the tunnel. There is a 70-horse power engine on the ground. The new mill will be started about the 1st of December.

Citizen: The California Exploration Company has begun operations on several of their properties in this vicinity. The company is doing prospecting and development work principally, employing three or four men in each mine. The corps of surveyors who are running off the electric line reached San Andreas last week, and the poles to be used are at Valley Springs.

It is reported at Murphys that negotiations are pending for the bonding of several mines owned by Antone Ponte of San Domingo, the Boulder Lead upon which a rich strike was made last year being one of them.

Fresno.

Investor: The decision of the United States Land Office, in which the term "mineral lands" is held to apply only to lands containing metalliferous ores, has already caused trouble in this State, in the Coalinga region, in the southwestern part of Fresno county. These petroleum lands have been developed into oil fields of some value, and the original locators who have spent money and developed their land as mineral claims, are now having trouble with a number of men who have come in and jumped the lands, filing homesteads on them on the ground that the legal decision referred to makes such lands open for homestead settlement. As is well known, the petroleum lands of California are sterile and broken, unfit for agriculture or for grazing. This is especially true of the Fresno county oil fields, where even in the spring season grass cannot be made to grow. There is no water near the petroleum fields, and, as the Fresno *Expositor* says, it is folly for any one to assent that he would seek such a forbidding region for a home. The homesteaders refuse to move, and as the original locators are determined to resist the usurpation of their land, trouble is feared.

Inyo.

There are more men now at work in the mines at Silver Peak than for several months past. There is reason to expect the work there to go on under its present management.

Mariposa.

Gazette: At the Horseshoe mine in Hunter's valley the owners have added another battery of five stamps to their mill. This will enable them to crush all the rock of the vein. Heretofore they crushed only the low-grade ore.

Nevada.

Transcript: The output of bullion at the Champion mine last month is said to be the largest ever produced by any quartz mine in this district in one month. Some very rich ore has recently been encountered and the mine is looking better than ever. Both mills are kept running night and day. The company has paid up all of the indebtedness, and the prospects are bright for big dividends to the stockholders in the near future. Next spring work will be rushed ahead on the North Merrifield and on the Spanish, both of which mines are now owned by the Champion company. Operations will be conducted on an extensive scale and it is believed that when everything is under way the company will have more men employed than at any other mine in the State, with one exception—the Utica mine at Angels Camp.

Union: A number of miners have leased the Gold Gravel mine on the Rodda ranch, about two miles from town, and will proceed to develop the claim at once. The company will put new hoisting and pumping machinery on the ground.

Union: The Plumbago mine at Moore's Flat is looking well and indications are that it will be paying dividends soon. There are three tunnels on the mine, one over 1000 feet, one 900 feet and the third 210 feet.

The quartz mill at the Old Home Consolidated mine, near the Mt. Vernon House, has started crushing. There is considerable ore on the dump and it is expected that enough will be taken out to keep the mill running steadily.

Placer.

(Special Correspondence).—The new tunnel the Pioneer Gold Mining Co. are now running to cut the present working vein at a depth of 510 feet below the present level, is being driven ahead at a very quick rate. For the thirty-one days ending October 31, 1896, this tunnel was advanced 306 feet, or nearly 10 feet every twenty-four hours, and for the week ending November 7th the tunnel has been advanced 78 feet. This is very fast work. The formation is in hard slate rock, with occasional bodies of very hard quartzite cutting through it. The size of the tunnel is 6½ feet wide, 7 feet high, and with a grade of 6 inches to 100 feet. The tunnel is being run with two 3½-inch drill machines. The holes are drilled to a depth of from 9½ to 10½ feet at each drilling, and it takes twelve holes in the face of the tunnel to break the face. The tunnel is now in 1500 feet and will have to run 1300 feet yet before the back vein is reached.

Sentinel: The Rising Sun mine, near Colfax, has produced hundreds of thousands of dollars in gold and has worked through a shaft to a depth of 900 feet. The cost of running pumps and hoisting machinery in operating the mine through the shaft was very great, so a bedrock tunnel has been completed for a distance of 200 feet. This tunnel will tap the mine at the 500-foot level. The mouth of the tunnel is near Bear river, and it will require 1800 feet of tunnel to tap the shaft at the old works.

Plumas.

Independent: The Harrison mine in Granite basin has closed down for the season, after a most successful season's work.

San Diego.

Ex-United States Senator Stephen W. Dorsey has returned from London where he went to obtain money for developing his mines in the Picacho district. Speaking of this he says: "The mill which I will erect will be at Picacho, twenty-eight miles north of Yuma. We have a 15-stamp mill there now, but the new one will be a 100-stamp and will treat an enormous amount of ore. We have some large ledges. The ore runs from $5 to $6 a ton, it being about twice as rich as that of the Alaska Treadwell mine.

"I will also build a railroad five and a half miles long to carry the ore from the mine to the mill, which will be located on the bank of the Colorado river."

Ramona *Sentinel*: There are some capitalists expected at Julian soon to look at the Helvetia property.

Some rich rock has been struck on the Lucky Ben claim owned by Bacon and Cook.

In the Rush district, Rush & Co., have drifted 70 feet on their Tellurium claim and have run through a 3-foot ledge of pay rock and are now drifting for the main chute of ore.

Shasta.

Free Press: The comparatively new mining camp of Harrison gulch still continues to show remarkable growth. The operations of Colonel J. H. Roberts of Sacramento in improving the mining property, which he recently purchased of Rhodes, Fowler & Benton, and in completing the mill are being retarded for the want of building material. Estimates made show that the Colonel will have expended $150,000 ere he is ready to begin crushing ore. The mining locations owned by Ferdinand Hurst are being developed and are showing up well. He recently shipped a carload of thirty tons of ore from one of his claims to the Selby Smelting and Lead Company, which netted him $182 per ton.

Siskiyou.

Journal: The miners in the Salmon river section, are preparing for their winter's work. They will begin piping just as soon as fall rains furnish them sufficient water.

At Oro Fino the Wright & Fletcher mine and the Eastlick brother's claims will not start up much before spring, as it requires a large head of water to run the mines. The Gardiner mine will be started up soon.

The owners of the Garret mine at Hamburg have leased it to a Chinese company for $3,000 for the remainder of the season.

The quartz mill at Mugginsville is about completed, and will soon commence crushing ore from A. Erno's mine.

The Chamberlain & Timmons mill, on Mill creek, is kept in operation constantly, and the owners expect a good return from the large amount of ore which they have on the dump.

The Columbia mine, adjoining the Mabel mine, near Scott Bar, is producing good quartz, which is crushed at the Columbia mill, on Mill creek.

Journal: The indications for a prosperous season next spring and summer in our mines are excellent. A number of new companies have made purchases in the county, and will have their new properties in full operation by that time. The big hydraulic plants on Thompson creek and Horse creek will greatly increase Siskiyou's gold product. Several new mills have also been built in the county, and will be in operation. Inquiries are constantly being made regarding mining properties by outsiders.

The pipe for the new company which recently purchased the Shinar mine, on Thompson creek, has been hauled to the mine, and the new ditch will soon be completed. The water will be carried across the Klamath river in pipes suspended by a cable.

The Seattle Placer Mining Company will soon commence operations on Thompson creek and will employ quite a force of men. It was purchased about two years ago for $10,000, and the new owners have made a great many improvements since.

The Klamath river dredger is still at work at Buckeye Bar, and the reports are that the owners are well satisfied with the results.

The Blue Gravel mine at Greenhorn will be started up as soon as there is sufficient water. This property has given employment to a number of men for several winters past.

Tuolumne.

Independent: In the past two weeks a large lot of heavy machinery, consisting of engines, boiler, and 14-inch pipe has passed through Sonora to the Confidence mine.

The Green and Tibbitts mine has rapidly improved in the last few weeks as development work has been done on it, and has lately produced ore of high grade in free gold.

NEVADA.

The Cortez silver mine will begin operations at once and 200 men will be put to work. This mine was a steady producer and is the property of Simon Wenban of this city.

Enterprise: A circular letter signed by President Forrester has been recently addressed to the shareholders of the Carson River Placer Mining Company, calling on them to subscribe 10 cents a share. Should the call fail to meet with a favorable response reorganization will be resorted to under a new title, which will render the present issue of stock worthless. The erection of a leaching plant of 100 tons daily, to cost $10,000 or more, is stated as the object of the subscription. The leaching process is to be adopted for working the low-grade sulphurets recovered from the bed of the river.

The company has been in existence for about twelve years under various titles, and has expended $120,000 in experimenting with costly dredging machinery.

The buried treasure on the river bottom has been vastly overestimated, some placing it as high as $30,000,000, but $10,000,000 would be a nearer guess. This treasure is not in the form of solid amalgam, but is mingled with the virgin material of the river, but in the form of slimes, sulphurets and floured or pulverized quicksilver. To arrive at a proper estimate of the amount of this material that has escaped in the form of tailings from the mill settlers, it must be taken into consideration that these tailings, after leaving the settlers, flowed over tables or blanket sluices swept three or four times in each twenty-four hours, and a large percentage of the coarser and valuable material contained therein was concentrated and saved by this process. It is probable that the only way to recover the buried treasure is to drain the river bed by diverting its flow through a flume of a capacity to carry its volume throughout the year. It is estimated that this would require a flume with a width of 40 feet on the bottom, with sides 4 feet in height, and would cost $60,000 a mile for the lumber. Whether the expense of recovering this buried treasure would warrant such an outlay is extremely problematical, as there is no method known whereby a fair average of the value of the material recovered can be obtained, on account of its constant shifting from point to point through the action of the water.

OREGON.

The miners who have been operating in Rogue river by means of wingdams have done well this season.

Operations have been resumed at the Jewett mine, near Grant's Pass.

The Consolidated Saxe Creek Mining Co. will resume work on their properties in a short time.

The date for the holding of the annual meeting of the Southern Oregon Miners' Association has been postponed to Nov. 16 at Grant's Pass.

Monitor Miner: E. O. Lampher and Chas. H. Lawrence, mining experts from Chicago, representing capital, have been in the country for the past ten days examining into mining resources.

Jacksonville *Democratic Times*: A run of ten tons of ore from the Goldbug mine, owned by Farnham, Billings & Lucas of Ashland, last week yielded $19 per ton in free gold, besides the concentrates.

C. L. Mangum has sold the Cameron ditches and water rights on Star gulch, in Applegate mining district, to O. G. Shurtliff, E. Sikes and others of Portland.

Grant's Pass will soon have a custom quartz mill and cyanide plant, to be erected by Dr. W. H. Flanagan.

WASHINGTON.

Spokane *Chronicle*: Word comes in of a rich strike in the Bald Knob mine at Methow Camp, in the Squaw creek district, near the Friday mine.

The Friday Company is making preparations to begin work on a smelter which is to be completed this year. Machinery for the new plant on Goat creek, twenty-five miles away, was hauled in two weeks ago and is now being put in place.

Large crowds of workingmen and prospectors are being attracted to the country by the recent strikes, and it is believed the coming winter will be one of great activity. The Red Shirt and Friday Companies are making preparations to employ larger numbers of miners than ever before.

BRITISH COLUMBIA.

(Special Correspondence).—Victoria, as the capital of the province of British Columbia, naturally focuses the news of the gold fields. A reasonable mining project meets with consideration and respect. In the island of Vancouver itself, outside of the coal measures there is but little actual mining going on. There are some excellent prospects that later may develop into mines. At Alberni the Consolidated Company is doing considerable work. This coporation owns four claims, the Victoria, Warspite, Chicago and Alberni. The shaft is down about 70 feet on the ledge, and there is a tunnel making connection with it at a distance of about 85 feet. The pay streak is rich. Recently a 3-stamp mill has been erected for sampling purposes and there is every indication to show that this Alberni country will shortly make a name for itself in the ranks of the gold-producing districts. It is well situated for economical working. Wood and water are plentiful. The ledges run N.E. and S.W. and appear to dip at an angle of about 70 degrees.

Gold mining is not a new thing in Vancouver Island. Over 40 years ago California miners came here and prospected around finding numerous indications of gold. The conditions at that time, however, prevented profitable work. To-day the old prospect holes are being reopened and with the economy that is now possible it appears likely that this district will develop into a permanent gold field.

As the capital of the province Victoria is the principal market for stocks and shares in mining companies, and a very considerable business in that way is transacted. In the new fields on the mainland there are dozens of companies whose stocks are dealt in by the people of Victoria. Most of these concerns are eminently respectable and are starting work with every prospect of success. There are, however, some, as is always the case in a time of gold mining excitement, whose object is to dig into the pockets of the credulous instead of into the bowels of the earth.

The British Columbia Board of Trade has just issued its 17th annual report. It is an extremely interesting document and is very credible to its compiler, Mr. F. Elworthy, the secretary of the Board of Trade. Anyone proposing to visit British Columbia would be wise to write for a copy of this report. It is distributed gratuitously.

On the subject of mining the report says:

"The value of the output of minerals, other than coal, increased from $1,241,031, in 1894, to approximately $5,000,000 in the year 1895, as follows:

"Trail creek district, 22,972 tons, yielding 45,950 ounces gold, 2,572,850 pounds copper.

"Slocan district, 9307 tons shipping ore, 30,000 tons concentrates, yielding 1,837,100 ounces silver, 17,145,000 pounds lead.

"Ainsworth district, 43,644 tons yielding 605,550 ounces silver, 28,906,800 pounds lead.

"Nelson district, 3707 tons, yielding 176,560 ounces silver, 494,370 pounds copper.

"West Kootenay, placer gold, $10,520.

"Cariboo, Cassiar, Yale, Lillooet and East Kootenay, placers, $491,025.

"Fairview and Camp McKinney, quartz, $135,000."

Victoria, Nov. 8th, '96. R. W. W.

Spokesman Review: The largest deal which has ever been made in the Slocan country was consummated on Friday last, when the two-thirds interest in the Ruth Mining Company, owned by D. C. Clark, J. P. O'Neill, F. E. Starkey and G. Y. Kessler, passed into the hands of H. M. Forster, a member of the English Parliament, for $166,666.66, practically cash.

Nelson *Tribune*: The prospects along the North Fork of Salmon have received considerable attention during the past two weeks and a number of transfers, involving nine claims in all, have been made.

During the past ten months at the North Star mine 6,000 tons of ore has been mined. Of this, 2,500 tons has been shipped to market. This output of 6,000 tons was taken from the drifts and crosscuts while developing the property, leaving about 40,000 tons in sight in the mine. The ore is sent to smelters in the United States.

The report of the shipments of bullion, matte and ore from the mines of Southern Kootenay for the last week in October shows that the total was 784½ tons, valued at $86,684. The total for 1896, so far, was 25,139⅛ tons, valued at $2,771,272.

Documents have been signed conveying the controlling interest in the Alpine group on head of Lemon Creek to a foreign syndicate for $60,000.

Ore will be shipped from the Bondholder, Neepawa, Oregon City and Enterprise so soon as snow flies, the latter putting out five tons a day at least.

The people on the coast are warming up on the subject of a railway from Southern Kootenay to the coast, in order to secure a portion of trade of the district. In view of the imperative necessity of a railway from the coast to Kootenay country, it is desirable that the provincial government build, equip

and control the said railway, pledging the credit of the province to that end, and that the coast cities be made common points, and that this board of trade ask the other provincial boards of trade to each appoint two delegates to meet and confer with the provincial governments on this subject without delay.

Trail Creek *News*: In the Cariboo country, at Quesnelle Forks, work on the Golden River Quesnelle Company's dam will be pushed, with 200 men employed all winter, and in the early spring it is safe to say 500 men will be employed. The Cariboo mine, in conjunction with its Moorehead lake ditch, and James Moore property that is to be opened up; the Montreal Company with their ten miles of ditch; the Fishback, Maud, Beavermouth, Harvey Creek, and other big properties; the big drifting and hydraulic mines of the Horse Fly, only thirty miles away Quesnelle Forks and vicinity will furnish employment to several thousand men. At Slough Creek, Willow River, Antler, Cunningham, Big Valley and other creeks and at Barkerville, where mines are being opened up to work by the Cariboo Gold Fields Company with a hydraulic elevator, considerable work is being done.

ALASKA.

A report from Tacoma says that J P. Ladd of that city, who represents a New York syndicate, will return to Alaska next season for the purpose of establishing a hydraulic plant on Resurrection creek. The Al-Ki brought news of the sale of the Horrible and Mexican lode claims in the Berners bay district by Frank Bach to L. Nicholai of Portland. The price was $60,000, of which one-fourth was paid in cash. The mines have two well-defined ledges, with over 400 feet of tunnels. The ore assays $8 to $10 per ton in free gold.

The Al-Ki brought down 240 California and Washington miners from Cook Inlet, who were left at Sitka over three weeks ago by the steamer Excelsior. About 175 men will winter in Sunrise city and Hope city.

IDAHO.

A telegram to the Denver *News* says: "The Helena and Frisco has been sold to the Standard Oil Company, who already own the Bunker Hill and the Sullivan. The announcement of the sale comes from unofficial sources, but there is no doubt that it has been made, although the transfer may not be made for some time to come. The Helena and Frisco is nearly all owned in Helena, and is one of the largest mines in the Coeur d'Alenes, employing 125 men and mills 525 tons of ore daily. Nothing is known regarding the price, but as it has paid $500,000 in dividends during the past year, the consideration must be a heavy one."

UTAH.

Among the companies most prominently interested in the annulment of the patent under which the MacArthur-Forrest people claimed the right to collect a royalty was the Mercur. It was made to answer directly in the action in which the claimants of the patent set up. The contest was taken up in South Africa, and there it was decided that the patent was invalid. Subsequently the Court of Appeals of England permitted the owners of the process to amend the exhibit on which they had procured their patent, and a few months later the Mercur people made a compromise with the patentees for $20,000. Meanwhile the Sunshine had adopted the process, and when a representative of the patentees called on the company to pay tribute, a suit similar to that in which the Mercur was engaged was threatened, then the Sunshine agreed to pay $119,000 for the use of the process.

At present the cyanide process is being used at the Spanish mill ot Bingham; at the Mercur, Marion, Geyser, Sacramento and Sunshine, in Camp Floyd mining district; at the De La Mar mine in Idaho, and very extensively at Cripple Creek.

Salt Lake *Tribune*: The Pleasant Valley Coal Company shipped from its Winter Quarters mine, near Scofield, about 12,000 tons of coal in October. They employ at their two mines there 150 miners and 75 other men, making a payroll of about 225 men. Miners are paid 60 cents per ton for mining coal, and their average earnings during the days operated are from $3 to $3.25 per day. Under the new law they are not permitted to work over eight hours in any one day, while an agreement among the miners limits them to six mine carloads each per day, the cars holding 1 to 1¼ tons of coal each. The mines are now being operated six days per week. During the summer it was from two to four days per week only, as the demands required. Besides its local market, the Pleasant Valley Coal Company is marketing much coal outside. Pleasant Valley coal is quoted daily in San Francisco market reports, where it is gaining popularity as a fuel for all purposes.

The Union Pacific mine at Pleasant valley turned out about 4500 tons of coal in October, and there are now employed about seventy men around the mine. This vein of 24 feet lies practically level.

The Wasatch Asphaltum Company has twenty-two men getting out asphaltum rock at its mines near Clear Creek station on the Rio Grande Western Railway. Shipments of this paving material have been going forward to Chicago pretty regularly for months for use in paving streets in several cities on or near Lake Michigan.

Park *Record*: The Silver King has a large body of free-milling ore, and the company has for some time been considering the feasibility of building a mill to work that class of ore, and may do so yet provided the market for silver takes a turn for the better.

Bingham *Bulletin*: Shipments in October were smaller than any other month this year, amounting in all to only 2000 tons. October is said to have been the first month in over fifteen years that not a pound of ore was shipped from the Old Jordan and South Galena mines. Local causes figured in the entire suspension, as all work done for some time has been in the line of development and putting the mines in repair; but, of course, the main drawback is the markets.

Since work was recently started at the Badger mine the vein has rapidly improved and is now showing 18 inches of rich sand carbonates and galena. The incline has reached a depth of 500 feet.

A deal has been closed by which a majority of the shareholders of the Golden Gate Mining Company of Mercur place their stock in escrow under an agreement giving J. B. Black control. The intention is to continue the exploration in depth.

MONTANA.

Butte *Inter-Mountain*: The financial troubles of the Golden Scepter Mining Company have culminated in the assignment of the company to Colburn & Brown of Philadelphia for the benefit of Eastern creditors, who hold claims amounting to $285,000. Colburn is the president of the Golden Scepter Company. Although the plant and mine are estimated to be worth at least half a million dollars, the stockholders were tardy about putting up money. Just what effect the present proceedings will have on the operation of the properties this year is not known.

Mining World: The Cumberland dump, said to contain about 10,000 tons of ore, will be hauled to Leadboro.

The operators of the Daisy mine at Cooke City, have cut through a 30-foot body of good milling ore. The operations have been removed to the other side of the hill to avoid the heavy snow fall.

Garver and Bunnel of Clancy have sold the G. & B. mine, located on the middle fork of Warm Springs creek, to Tommy Cruse and W. J. Sweeney of Helena. The price said to be paid for the property was $50,000.

The Gold Dredging Company operating near Bannack has closed down all work for the season. This season's operations have proved the ground to be more valuable than was originally claimed.

Work on the Clark's Fork gold dredging machine has been suspended. C. H. Dietrich, president of the company, says that the undertaking so far has not proved a success, the chief fault being that the sluice boxes are too small for the size of the steam dredge, thus preventing the successful washing of the gravel raised from the bed of the stream. It is proposed to have larger sluice boxes constructed of steel and mount them on pontoons.

The Overwich country is beginning to show up and attract outside attention. The Black Jumbo and Little Pete claims, owned by Joe Burgoyne and others were recently bonded to a Chicago syndicate for $30,000.

WYOMING.

The Carbon County and Gold Coin Mining Company has contracted for the erection of a stamp mill in the Cooper Hill mining district near Laramie.

A wonderful discovery of gold ore is reported in the Grand Encampment mining district, in the southern part of Carbon county. A prospector made the find. The lead is 40 feet wide and projects out of the ground for several hundred yards.

SOUTH DAKOTA

Black Hills *Times*: The St. Elmo M. & M. Co. have opened up a new and large vein of rich ore on their property situated near Hill city.

The Big Owl M. Co. will resume work in a few days on their group of four claims, situated on the southeast slope of Elk mountain.

COLORADO.

Republican: The Cripple Creek district is producing more ore than ever, the output ranging between 500 and 600 tons a day. It begins to look as if the camp may exceed the estimated production of $10,000,000 for 1896.

Twenty-eight sets of lessees are now working on various blocks of the Pike's Peak placer, located in the northwestern suburb of Cripple Creek. The Lewis leasing shaft is producing some ore of good grade from a first-class vein three feet in width, and the indications are strong for a mine.

In October the Union Gold Company produced 600 tons of $50 ore, making the month's yeld in round numbers $30.000. Owing to the fact that the Union properties have reached that stage which requires more permanent improvements, dividends are not being paid.

The Morning Star mine's new plant at Ward has been successfully started and thirty men are employed under ground in development work and knocking down ore. The company recently purchased the mine for $65,000, and has spent $20,000 in improvements in and upon the property. Another $20,000 is yet to be spent in additional equipment.

In the San Juan mining region at Eureka Gulch there are three mills with a capacity of 325 tons a day; at Telluride, including the Tomboy and Smuggler-Union, five mills with a combined daily capacity of 750 tons, and at Ouray one mill, the Revenue tunnel, with a capaciey of 300 tons.

In the Pitkin district a newly organized company is doing extensive development on the Red Jacket group of six claims, located on West mountain, about a half mile below Pitkin.

The Cleopatra mine is employing a large force of men and is producing a high grade product of silver-lead ore.

J. C. Gifford, a member of the Chicago Board of Trade, has purchased the Golden Inlet mine and put a force of men to work. The Golden Inlet is considered by mining men to be one of the best properties in the gold belt.

The Argentum-Juniata Company of Aspen has issued its report for July 1st to October 1st, which shows that the aggregate shipments was 1,361 tons of ore, which returned 105,971 ounces of silver, valued at $68,212.12; smelting and railroad charges amounted to $12,166.68; mine operating expense and sampling at Aspen used up $35,483.53, leaving as a net profit at the mine for the three months of $20,566 91, the average gross value of the ore being $50 a ton.

At Saw Pit a new strike has been made in the breast of the Nancy Hanks tunnel, which is now in 410 feet.

The Belle Champion tunnel is in 430 feet, running 100 feet below the contact. An incline upraise is being driven to reach the contact, where it is said that 100 cars of ore are already blocked out.

At Central City the Calhoun shaft is now down 750 feet and Manager Bliebel intends to sink at least another lift on the 100 feet. Drifting and stoping work is also being prosecuted and shipments of mill ore are being made sufficient to keep two batteries of stamps dropping at the mills on ore, which gives returns of from two to three ounces in gold.

Word comes from Idaho Springs that the people working the Cecil mine in the Cascade have reached the ore chute for which they have been drifting for a year. It is proving all that was expected, and it is the intention to make the first shipments from the present workings.

A company has been organized to erect a portable smelter near Camp Carter for testing ores of the adjacent territory.

The new ten-inch water pipes recently purchased by the Elkton Company have been put in place and connections with the big pump made at the 300-foot station. The new pumps will be placed at the 400-foot level, where a big station 40x16 will be cut for them. The flow of water into the mine is about 500 gallons per minute.

ARIZONA.

(Special Correspondence).—The Black Copper group, the property of the Black Warrior Copper Company, capital $1,000,000, is in Globe mining district, seven miles west of Globe. John Whyte represents the interests of the Eastern syndicate. He and Supt. W. W. Hill are preparing for the reduction plant, which will include a blast furnace with a capacity of 120 tons per twenty-four hours. It is also probable that the company will erect a large leaching plant. This company also owns the Selby mine, four miles west of the Black Copper group. The ores of the Selby are chalcocite and carbonate and carry a large amount of iron. The company is now driving a cross-cut tunnel, which, when completed, will be 200 feet in length and will reach the ledge at a depth of 100 feet. The ores from this mine will serve as fluxings for the chrysocolla ores of the Black Copper group. A hoisting plant is to be built and the sinking of the Black Copper shaft resumed and run to a depth of several hundred feet. Matters in Globe have assumed a promising aspect. All lines of business are gaining in activity, and especially so since this company has shown its intentions, known to be undoubted, of becoming a large copper producer, and will add greatly to the already active Globe mining district.

The Continental group, which is situated eleven miles west of Globe and four miles west of the Black Copper group, lies between carbonaceous limestone and granite. Toward the southeast end of the Continental mine the granite gives place to diorite. The limestone runs along the full length of the Continental group, and as far as the Selby mine, while the granite runs along only part of the Continental group to the point where the diorite takes its place. The Continental has a large cropping of gossan mixed with chalcocite and copper carbonates. The cropping is over 50 feet in width and is tilted up like an immense cliff, over 60 feet high, from the mouth of the tunnel. Work will commence on the Continental Dec. 15th. It is anticipated that, when work is commenced upon this group and properly developed, it will number among the largest and most profitable producers of copper, gold and silver in the Territory of Arizona. Not only do the ores of the Continental carry a paying amount of gold and silver, but also a sufficient amount of iron and lime, which is a valuable item in the matter of fluxing, and thus the ores of the Continental are self-fluxing and will not necessitate the adding of foreign sterile fluxing materials.

The commencing of work on the Black Copper group, and the movements in the same direction upon the Continental, together with the operations of the two old companies—the Old Dominion Copper Mining and Smelting Company and the United Globe Mining Company, which two latter companies have been operating here for a number of years—all bespeak a great future for the town of Globe.

The property of the Girard Mining Company is situated in Lost gulch, six miles southwest of Globe. This company will put its 10-stamp mill in operation about the 10th inst.

Globe, Arizona, Nov. 1st.

SOUTH AFRICA.

South African *Mining Journal*: The report of the directors of the Rand Central Ore Reduction Company showed a very satisfactory state of affairs. A dividend of 10 per cent was declared, absorbing the sum of £14,875, and £5875 is carried forward to the new account. The company experienced difficulty during the year in making contracts for the treatment of sands, owing to the reluctance of mining companies to dispose of their stocks and in consequence of all companies treating their own productions at works erected by themselves. At the chlorination works a total of 2069 tons was treated and 10,153.52 ounces of fine gold was recovered. Plants are now at work at the Worcester, the May Consolidated, the Crœsus, the Robinson, the Crown Reef and the Bonanza companies, with an estimated total monthly tonnage of 25,000 for sands and 13,000 for slimes. Plants to treat 81,000 tons of sands and 34,000 tons of slimes are in course of construction, including the Van Ryn Estate, the Van Ryn West, Knights, Ginsberg, Glenluce, Lancaster, York and Balmoral companies.

Delegates to the Miners' Convention.

The following is a list of the delegates to the Convention as reported by the Committee on Credentials:

Alameda.—J. S. White, W. R. Thomas, T. W. Jeffries, A. H. Ricketts, S. H. Christy, E. H. Benjamin, George Burdick, W. E. Hale, G. I. Taggart, H. G. Blaisdel, Du Ray Smith, F. Chappellet, Mark Webber, W. C. Ralston, E. C. Regney, E. C. Loftus, Warren Shelling, Robert McKillican, John B. Eldridge, L. W. Foesting, R. R. Grayson, C. W. Childs, O. W. Jasper, W. G. Hawkett, John Driver, B. H. Mason, Daniel Best, Lyman Bridges.

Amador.—M. J. McDonald, C. E. Purington, E. E. Roberts, John R. Treglown, W. F. Keeney, John B. Treglown, E. C. Voorhies, Morris Brinn, John Ross, W. E. Dawns, S. M. Knight, J. H. Tibbetts, William Castle, W. J. McGee, John Treglown, Jackson Dennis, C. W. Randall, W. R. Thomas, W. E. Detert, John F. Davis, David Guiman, J. E. Dye, A. Cammetti, John M. Wright, L. F. Reichling, Col. H. D. Ramlett, Mr. Bibo, E. A. Freeman, John A. McIntyre, James T. Parks, Mr. Sargeant, Robert Robertson, Dr. Thomas Boyson, W. T. Jones, Thomas W. Jeffers, A. L. McWayne, J. H. Barney, James T. Wheeler, C. L. Haskins, P. Clute, A. Cassinelli, Frank Frades, J. W. Surface.

Butte.—Mr Sprague, W. E. Duncan, Sr., A. F. Jones, Frank McLaughlin.

Calaveras.—Ira Hill Reed, Richard Parker, T. T. Lane, Mr. Burleson, L. F. Sheperd, Sam E. Redmond, J. J. McSorley, E. C. Loftus, W. H. Clary, A. J. Brooks, Mark B. Kerr, Thomas E. McSorley, Edward Casey, W. Hooper, George Taylor, C. D. Lane, Alvinza Hayward.

El Dorado.—John Mellon, J. J. Crawford, N. E. Ricket, A. H. Ten Broeck, Thomas Clark, D. W. Morgan, A. Blane, O. S. Boekboe, James Richards, G. W. Harvey, D. H. Jackson, A. A. Wood, W. E. Chapman, W. H. Husband, Fred Husband, J. M. Brown, G. H. Burnham, J. F. Lang, C. N. Weatherwax, W. S. Mery, E. Bend, Max Mierson, M. Varozza, W. C. Root, J. H. Bradley, L. D. Greater.

Los Angeles.—F. W. Edelsten.

Nevada.—J. S. McBride, R. C. Walrath, Fred Zeitler, W. F. Englebright, M. Bates, E. J. Rector, J. S. Gregory, H. Lane, Geo. Nihell, W. Gibble, F. Eilerman, Geo. C. Gaylord, M. L. Marsh, Will Fisher, Geo. E. Turner, W. G. Richards, S. D. Matson, J. M. Walling, J. J. Jackson, C. J. Braud, Chas. Stepp, C. H. Mallon, J. A. Northway, Niles Searles, W. Martin, Dani Nirens, C. Schuster, D. McFall, J. T. Morgan, Joseph Fetz, Gus Kartgchoke, Fred Searles, Geo. C. Shaw, F. E. Wadsworth, N. P. Brown, Dr. E. F. Lebrech, A. H. Walrath, Mat Isoard, H. Pengelley, P. Tautphaus, Fr. Breckman, Jas Herster, C. Jepson, L. L. Myers, R. D. Sliedmore, J. H. Helwig, W. Mobley, Henry German, P. Curerow, Daniel Collin, C. E. Uren, F. J. Dawson, Thos. Pierce, Alf. Tregidgo, H. G. Parsons, W. F. Presk, C. E. Clench, Arthur Foote, Joseph Weissbein, Samuel Granger, J. L. Lakeman, John Glassow, L. E. Phillips, M. Farrell, E. C. Culver, John Eddie, T. H. Wilhelm, Geo. D. McLean, Louis Dorsey, Geo. Mainhart, D. B. Marsick, R. R. Porter, J. P. Maleville, Wm. Campbell, Edw. Morgan, Geo. Fletcher, Jas. Haskings, M. Sproul, J. F. Kidder, M. G. Taylor, W. R. Erckart, James Bennallock Sr., Wm. George, R. Linder, J. S. Goodwin, L. J. Graver, C. D. Einstein, H. Fuller, G. Ozalli, C. Peach, O. Waehler, E. J. De Sabla, C. L. Miller, R. H. Thomas, Robert Walker.

Placer.—Richard Thomas, John Landers, P. C. Secor, Wm. Rea Sr., R. M. Clarken, Col. Davis, B. J. Watson, Dr. B. B. Brower, J. F. McCall, J. P. Burchards, S. S. Vail, F. J. Horswell, F. G. Durning, Chas. D. Aikers, L. S. Moffith, S. M. Sprague, H. Simons, M. R. Gleeson, D. A. Russell, John Papa, Frank Papa, T. Michaels, Benj. Rossi, G. W. Cross, F. I. Adge, Seymour Waterhouse, C. G. Kershner, G. R. Cowan, Harold T. Power, St. C. Nye, Geo. Cooper, John W. Clark, John H. Ferguson, F. E. Colburn, T. J. Nichols, M. F. Lawrence, F. H. Bell, John Adams, J. M. Fulweiler, Chas. F. Reed, James L. Gould, J. E. Doolittle, John Nichols, Louis Petzlaff, Chris Ranckel, Morris Lobner, Henry Desque, Ivan B. Parker, W. A. Edenger, Henry Lobner, Allen Towle, Andrew Rodger, Joseph Dixon, Wm. Rodger, Wm. Rule, D. M. Kent, M. Morgans, F. Chappellet, Thomas Crosby, G. S. Sanborn, Chas. E. Mason, Chas. F. Hoffman, W. W. Ramsdell, Robert Jones, John C. Boggs, Chas A. Reed, Pillar Lozano, G. C. Hepburn, A. E. Moody, Edward Politka.

Plumas.—A. B. White, S. W. Cheney, G. P. Cornell, J. H. Roberts.

San Diego.—L. L. Aubury,...

San Francisco.—S. K. Thornton, Samuel J. Hendy, Niles Searles, L. F. Reichling, Louis Sloss, C. W. Cross, Julian Sonntag, Andrew Carrigan, A. J. Ralston, T. R. Church, Edw. Belcher, Louis Glass, Chas. G. Yale, Sam'l W. Backus, T. J. Parson, Louis Janin, W. D. Leonard, J. M. Wright, Geo. Stone, W. F. C. Hasson, F. H. Huntington, J. F. Halloran, W. W. Montague, Geo. Goodman, Geo. C. Sargent, B. D. Pike, Henry Pichoir, Geo. Johnston, Geo. W. Tomb, Alfred Holman, Calvert Meade, Jacob Frawenfeld, B. T. Lacy, James W. Abbott, J. C. Campbell, Ross E. Browne, Edward Coleman, Wm McDonald, John C. Coleman, Thos. Barber, Wakefield Baker, Squire Mooney, Charles Altenburg, F. W. G. Maebus, Doorman, Thomas Lally, Geo. A. Ames, Hugh Craig, J. C. Newson, D. E. Hayes, D. E. Miles, Thos. Kirkpatrick, Chas. Watt, A. McLaughlin, S. H. Tacy, John Bermingham Capt. W. F. Mills.

Santa Barbara.—J. B. Treadwell.

Santa Clara.—Chas. C. Derby, Robt. R. Bulmore, Edw. W. Carson, Richard Pearce, Thomas Wasley.

Siskiyou.—A. H. Bar. Maj. A. G. Myers, Martin C. Beem.

Sierra.—J. M. Harper, Chas. P. Gale, Julian Sonntag, Andrew Carrigan, Thos. Kirkpatrick, P. Carberry, Paul Meroux, H. W. Orear, J. W. Orear, H. H. Squire, John Scott, S. Purdy, Frank R. Wehe, Edw. F. Wehe, Tirey L. Ford, Lewis F. Byington, Wm. H. Byington, Louis Rosenfeld, Mason W. Mather, J. O. Jones, E. A. Miley, F. W. Page, Jas. McGregor, F. H. Campbell, W. F. Hanly, A. B. Moulder, Claude T. Hamilton, P. Van Cleif, I. Copeland, A. J. Meroux, Stanley H. Smith, J. A. Vaugh, J. F. Cowdery, Dan P. Cole, M. H. Mead, Henry Kingdon, A. Westall, H. Spalding, Sr., W. F. Eschbacher, John Costa, W. J. Holmes, Thos. H. Crossman, Jas. S. Wiggins, P. R. Gardner, J. M. Haven, I. T. Mooney, Geo. D. Gray, Giles H. Gray, Thos. C. Haven, J. H. Hickox, W. W. George, G. W. Hughes, C. C. McIvor, Henry Rosenfeld.

Shasta.—H. A. Keller, J. C. Hopper.

Tuolumne.—E. C. Loftus, D. R. Oliver, W. J. Sharwood.

Yuba.—J. O'Brien, Thomas Conlin, E. F. Holbrook, John McQuaid, W. W. Chamberlain, Louis Comath, C. C. Durnam, Joseph Durfee, O. C. Mayo, W. R. Meek, J. C. Campbell, James Nelson, Daniel Settens, Wm. Jeffards, Wm. C. Hall, G. McM. Ross.

Kern.—B. F. Price.

Madera.—J. W. Ragesdale.

Alpine.—O. Nelson.

Colorado.—Edward J. Field.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING NOVEMBER 3, 1896.

570,785.—NECK YOKE—J. S. Brown, Eureka, Cal.
570,537.—CLOTH CUTTER—J. Brusie, Oakland, Cal.
570,841.—OPERATING WINDOWS—M. M. Canfield, Seattle, Wash.
570,661.—STEP LADDER—W B. Cantrell, Seattle, Wash.
570,623.—SHIFTING APPARATUS—A. Chavanne, Grass Valley, Cal.
570,843.—ORE SEPARATOR—H. M. Copland, Scottsburg, Or.
570,738.—CAR AND RETORT—Curtis & Isaacs, S. F.
570,789.—NUT LOCK—E. Fluehr, Sprague, Wash.
570,727.—VALVE—H. B. Gale, S. F.
570,628.—LETTER BOX—F. G. Gaschlin, S F.
570,550.—LIFTING JACK—W. L. Hall, Spokane, Wash.
570,705.—POWDER—F. A. Halsey, San Rafael, Cal.
570,753.—HAY LOADER—J. T. Hare, Fresno, Cal.
570,799.—BARREL BUNG—J. Henn, S F.
570,756.—STEAM TURBINE—R. Hewson, S. F.
570,665.—SASH FASTENER—C. Hoffman, Spokane, Wash.
570,636.—IRONING TABLE—C. L. Hofwolt, Santa Rosa, Cal.
570,637.—CHAIN LINK—B. Holt, Stockton, Cal.
570,807.—STOCKING—J. H. Jessen, S F.
570,639.—POLISHING MACHINE—Jessup & Wheelan, S. F.
570,483.—AIR BRAKE—C. W. June, Ellensburg, Wash.
570,640.—COOKING PAPER STOCK—M. D. Keeney, Antioch, Cal.
570,641.—COOKING PAPER STOCK—M. D. Keeney, Antioch, Cal.
570,643.—ROTARY PUMP—J. D. Keller, Santa Clara, Cal.
570,601.—RAILWAY SPIKE—E. E. Knight, S. F.
570,670.—SASH LOCK—D. O. Livermore, Los Gatos, Cal.
570,763.—FRUIT BOX—E. R. Morrill, Truckee, Cal.
570,649.—GAS ENGINE—R. J. Rolfson, S. F.
570,584.—ROTARY ENGINE—C. G. White, Woodland, Cal.
570,526.—WATER ELEVATOR—M. H. White, Wanatchee, Wash.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

LINKS FOR DRIVING CHAINS.—Benjamin Holt, Stockton, Cal. No. 570,637. Dated Nov. 3, 1896. This invention relates to an improvement in the links composing driving chains. It is especially adapted to that class of chains in which the links are cast in malleable metal narrower at one end than the other, so that the narrower end of one link fits between the wider end of the opposite one, and they are united by a pin passing through the two. The improvement consists of a link of this description, having a sleeve or barrel cast with and extending between the narrower end a pin or bolt, the ends of which are fixed in openings in the wider end of the link, said sleeve or barrel being a complete cylinder, having its pin-hole offset upon the side against which pressure and wear are brought, the offset extending from end to end of the barrel, and a segmental wear plate removably fitted to the offset, so that it may be replaced whenever worn out without destroying the remainder of the link.

STEAM TURBINE.—Robert Hewson, San Francisco, Cal. No. 570,756. Dated Nov. 3, 1896. This invention relates to an apparatus or motor in which steam or other elastic medium under pressure is employed. It consists of a peculiarly constructed wheel with a series of buckets concentric with the axis or shaft, into which buckets the propelling medium is admitted under pressure to act expansively and with reactionary force, and is conducted successively from one series of buckets through stationary concentric chambers upon each side of the wheel to the next interior buckets and is finally exhausted from the last chamber surrounding the shaft.

CLOTH OR TWINE CUTTER.—James Brusie, Oakland, Cal. No. 570,537. Dated Nov. 3, 1896. This invention relates to a cutting device, which is applicable to the hand of the operator and is especially useful for cutting cloth where goods are to be cut into lengths, and also the string with which packages are done up. It consists essentially of a flexible band to be fitted upon the hand, a disk fitted upon the band having a groove or channel transversely across its outer face, a central hole made through it with a countersunk depression on the inner side concentric with the hole, a bar fitting the exterior groove or channel with a shank extending through the hole, having a head fitting the depression beneath and a spring holding the bar in place, said spring yielding so that the bar may be drawn up and reversed and the cutting blade fixed to the exterior surface of the bar.

ROTARY ENGINE.—Charles G. White, Woodland, Cal., assignor of one-half interest to J. F. Hink, same place. No. 570,584. Dated Nov. 3, 1896. This invention relates to an apparatus which may be used either as an engine or a pump and is designed to provide certain improvements in that class of rotary machines in which radial pistons are movable in planes parallel with the shaft and are alternately projected into the upper portion of the cylinder and withdrawn therefrom. It consists essentially of a cylinder case, a drum or cylinder fitting one end of the same with a central shaft, radial grooves or channels formed in the cylinder having rectangular blades or pistons slidable in them, a hub extending from the cylinder to the end of the open space in the casing having corresponding grooves in which the inner edges of the pistons are guided, a cam-shaped channel formed in the interior periphery of the case, lugs projecting from the outer edges of the pistons to engage with the channel, so that the rotation of the cylinder alternately projects and retracts the piston, and a segmental abutment extending across one side of the open chamber of the case from the interior periphery to the hub, and inlet and outlet openings adjacent thereto.

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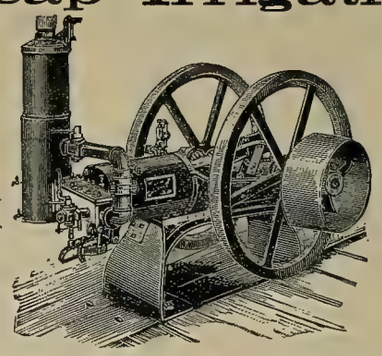

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Notwithstanding what some other makers claim, we guarantee our Engines to work perfectly on California Crude Oil or Distillate, or any other kind of gaseous Oil; we however prefer CALIFORNIA CRUDE OIL, notwithstanding what some other makers of Gas Engines say to the contrary, for the reason that gas from Crude Oil will produce more power from the number of feet of gas used than from any other Oil, and it is also a natural lubricant as well, the valves being always lubricated sufficiently to prevent them from sticking, thus assuring greater durability of the working parts than it otherwise would be in using dry gas, as is the case with other makes of Gas Engines which are compelled to use dry gas produced from one kind of oil. And another advantage we claim is, that danger from explosions is reduced to a minimum, there being no accumulation of gas, but is used by the Engine as fast as it is generated and hence is absolutely safe. The following is a test that we made with one of our Five-Horse Power Crude Oil Engines, running ten hours on the different gas oils:

California Crude Oil, 40 gravity,	7½	gallons at 7	cts.,	.52½
Distillate	40	"	7½	"	8	"	.60
Domestic Coal Oil	40	"	7½	"	12½	"	.93⅜
Gasoline	74	"	8⅛	"	15	"	1.21¼
City Gas	1000	feet,					2.00

We will guarantee the above results, and we are prepared to convince any one that our Crude Oil or Distillate Engines can be operated for less money than any other so-called "Distillate" Engine made.

There is an abundance of first-class Crude Oil produced in this State and of the very best quality, and recent discoveries have demonstrated the fact that it contains very little, if any, asphaltum and the Oil is of a rich green color which denotes a paraffine base, notwithstanding what other Gas Engine makers might say to the contrary, whose Engines cannot be operated on Crude Oil. This Crude Oil can be and is purchased at the oil wells at 3 cents per gallon in any desired quantity. We will guarantee that one and a half gallons of this Crude Oil will produce one-horse power running steadily for ten hours (when used in our Engine) and that the residue will not exceed three-fourths of a gallon in ten gallons, and this residue is not a loss but is a fair lubricant and can be used as such on any part of our Engine. We have sold a large number of Engines and a greater part of them are running on Crude Oil, and our customers cannot say enough in their praise.

We manufacture all sizes from two-horse power up, and will guarantee that our Engines will run cheaper and are more simple in construction, have fewer parts and hence are more durable than any other Gas Engines on the market. Seeing is believing; don't take our word for it, but come and investigate for yourselves. You can always see one in operation at our works. We will be pleased to see you and will at all times take pleasure in showing them up. Our Engines are specially adapted for running well and mining machinery—in fact, for any kind of power desired. We are the pioneers and first inventors of Crude Oil and Distillate Engines. **We always lead and never follow.** Send for Catalogue and Price List of the only genuine Crude Oil and Distillate Engine made.

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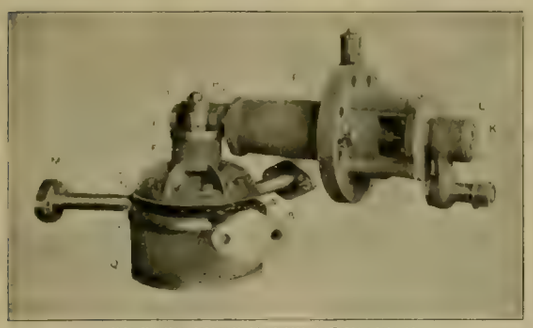

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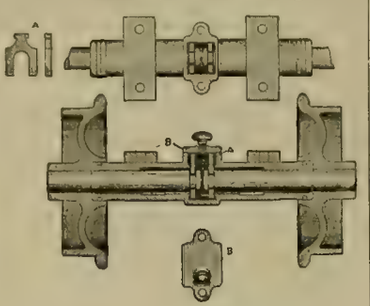

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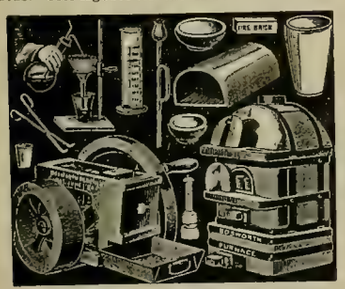

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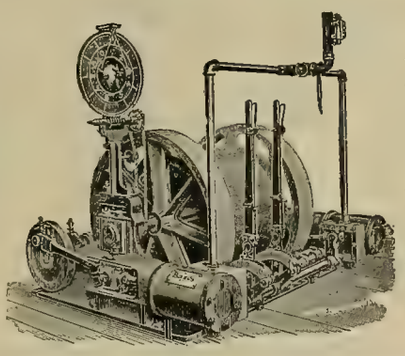

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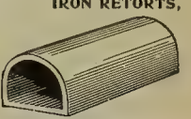

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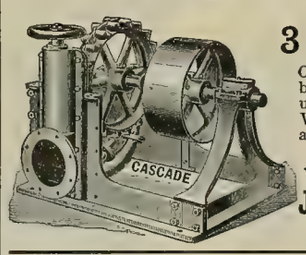

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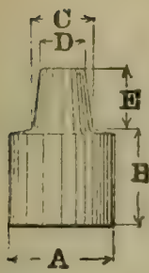

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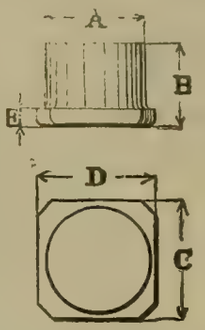

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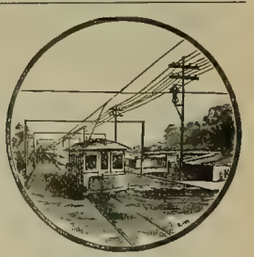

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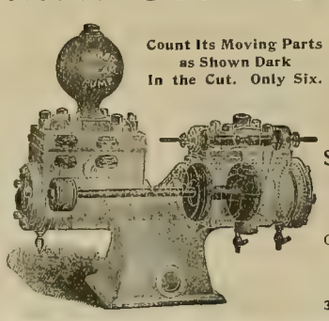

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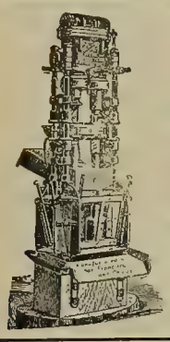

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Consisting of One TREMAIN STEAM STAMP, with Automatic Feed, capacity from 8 to 12 Tons a Day; One Upright Boiler; 20 Feet Electro Silver Plate, and all Pipes and Fittings necessary to connect Boiler and Mill.
Total Weight, About 5000 Pounds.

It requires no belting, shafting, pulleys or building.
Can be transmitted in section or whole. Well adapted to localities difficult of access. Weight, 3000 pounds.
Its practicability was fully demonstrated by its enormous sales of 1895, which exceeded those of two former years, and is now in successful operation in Africa, Alaska, Mexico, Colorado, South America, California, Canada, Montana, Oregon, Central America, Arizona, Dakota, New Mexico, Wyoming, etc.
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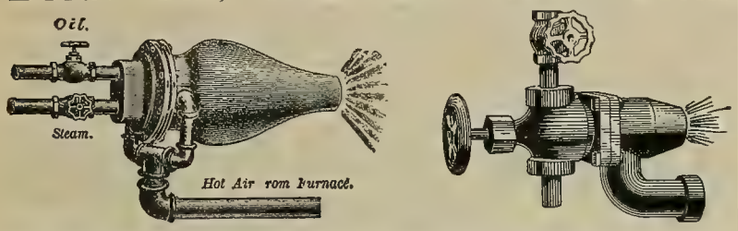

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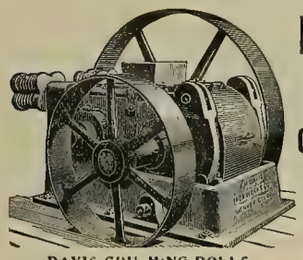
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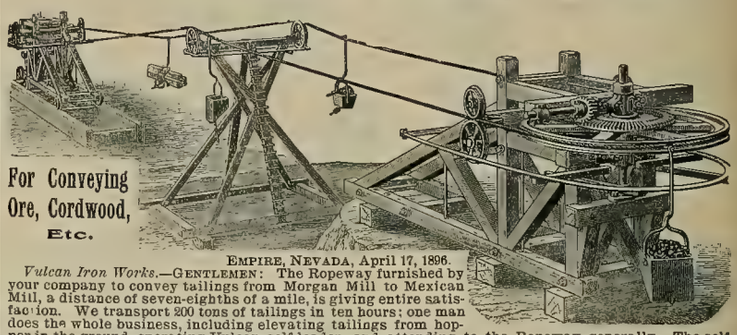
—WITH—
AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.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EMPIRE, NEVADA, April 17, 1896.
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Yours very truly, J. P. WOODBURY, Supt.

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MANUFACTURERS OF MINING MACHINERY,
Cor. First and Mission Sts., San Francisco, Cal.

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Manilla Roofing.

A SUPERIOR ARTICLE AT A SMALL COST.
250 Square Feet, with Nails and Paint Complete.....$4.00

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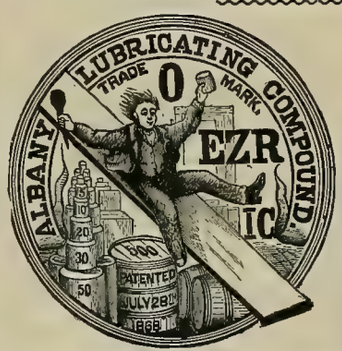
THE OLD RELIABLE!



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TWENTY-SEVEN YEARS' CONTINUOUS SERVICE in the great Mines, Steamships, Railroads and Mills all over the world prove it to be
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34-36 FREMONT ST., SAN FRANCISCO.
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ADAMANTINE SHOES AND DIES
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CHROME CAST STEEL
Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

STAMP SHOES.

STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.
H. D. MORRIS & CO., Agents, 141 and 143 First Street, San Francisco.
Special attention given to the purchase of Mine and Mill Supplies.

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H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.
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MANHATTAN RUBBER BELTING, PACKING AND HOSE,
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LIGHT STEEL RAIL.

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GOLD, SILVER, LEAD AND COPPER ORES,

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SMELTING WORKS:
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We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Morcing & Neal's Code and Bedford McNeill's Code.

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THIS TRAMWAY IS THE BEST THAT HAS EVER BEEN PLACED ON THE MARKET. IT HAS NO RIVAL. IT IS STRICTLY AUTOMATIC AND ITS CAPACITY RUNS UP TO 1000 LBS. PER BUCKET. ANY ONE CONTEMPLATING THE ERECTION OF A TRAMWAY SHOULD INVESTIGATE ITS MERITS BEFORE PURCHASING ELSEWHERE. . . . . .

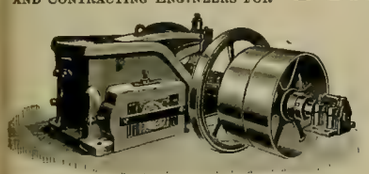
THE COLORADO IRON WORKS COMPANY, Denver, Colo.

SOLE AGENTS AND MANUFACTURERS.

WE ARE MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR Gold, Silver, Lead, Copper and Pyritic SMELTING FURNACES.

AMALGAMATION AND CONCENTRATION PLANTS.

Investigate Our Late Improvements in ORE CRUSHING MACHINERY.
We Guarantee Capacity Per Day to Any Degree of Fineness. . . . . .



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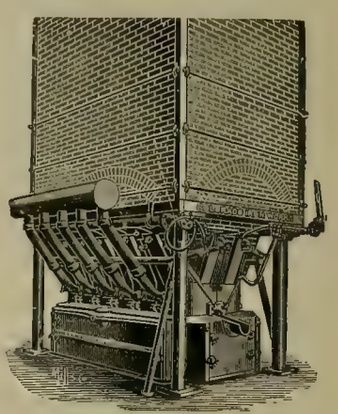
OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

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INGERSOLL-SERGEANT PISTON INLET AIR COMPRESSORS AND ROCK DRILLS

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NOTICE TO GOLD MINERS!

SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

San Francisco Novelty and Plating Works

Incorporated.

SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

Justinian Caire, Agent
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—DEALER IN—

Assayers' and Mining Material.

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BATTERY SCREENS AND WIRE CLOTH.

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Hoskins' Hydro-Carbon Assay Furnaces.

"Ferrite" and Projectile Steel Shoes and Dies.

Cheaper Than Cast Iron.

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RIX COMPRESSED AIR MACHINERY COMPANY,

11 AND 13 FIRST STREET, SAN FRANCISCO, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 12, 1896.

There is a more cheerful and confident feeling in all branches of trade and leading manufacturing circles. Jobbers report more orders coming in for goods, while manufacturers state that they are well supplied with orders, with more being figured on. Hoarded money is coming out for investment, which is calculated to create a better demand for speculative and legitimate investment propositions. It is stated that there is quite a perceptible increase in the inquiry from abroad and from the East for gold mining properties. It is also stated that bonds and better-class securities can be placed now to a much better advantage than one or two months ago. The high and strong market for grain has a very marked and favorable influence on general trade and inspires the belief that it will be felt well into, if not throughout, the coming year.

The local money market is working easier, with the opinion prevailing that before the close of the year there will be a much better feeling in financial circles than has prevailed for a year past. Money is coming out from its hoarding, while the heavy disbursements for farm products, particularly for wheat, is putting large sums of money into circulation. These favoring conditions will have at an early date a decided effect on many languishing industries, and bring about a more general desire for realty, mines and similar investment propositions. Eastern advices are of a decidedly favorable character. The banks report money being redeposited and a better demand from the trade and manufacturers, which indicates improving times. It is stated in well-informed circles at the East that by the end of the current month fully 200,000, if not more, heretofore idle hands will be at work in the different manufacturing industries. This of itself will have a large beneficial influence. A New York journal, just to hand, says that, looking at the matter broadly, it would seem that the prolonged era of cheap money all over the world is coming to an end. At all the European centers, thanks largely to improved business and greatly increased speculation, the low rates have passed away and the inauguration of a period of industrial improvement in this country, bringing with it a great speculation, would unquestionably give New York bankers a good average 4% to 6% market right along.

Mint Director Preston still maintains that the gold production this year will not be less than $220,000,000, against $203,000,000 last year, and an almost uninterrupted increase since 1890, when the world's production was $118,848,700. He says that the political troubles in South Africa and the strike at Leadville have checked output somewhat. The United States yield is expected to be about $50,000,000, South Africa $50,000,000 and Australia perhaps $48,000,000. Colorado is expected to produce this year over $16,000,000; California about the same, and Montana and South Dakota over $4,000,000 each. The Russian output is expected to increase $5,000,000. The silver production of the United States is estimated at $57,000,000.

New York Silver Prices.

NEW YORK, Nov. 12.—Following are the closing prices for the week:

	Silver in—London.	N. Y.
Friday	29 15-16	64⅞
Saturday	30	65⅛
Monday	29 15-16	65
Tuesday	29 15-16	65
Wednesday	29⅞	64⅞
Thursday	29 13-16	64¾

	Copper.	Lead.	Iron.	Tin.
Friday	10 75	2 85	10 25@12 50	13 05
Saturday	10 85	2 90	10 25@12 50	13 05
Monday	10 90	2 95	10 25@12 50	13 05
Tuesday	11 00	2 95	10 25@12 50	13 05
Wednesday	11 00	2 95	10 25@12 50	13 05

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	Par
New York Telegraphic Transfer	5 c. Prem
London Bankers' 60 days	$4.83
London Merchants	$4.82½
London Sight Bankers	$4.86
Refined Silver, per oz., 1000 fine	64¾
Mexican Dollars	51@52

SILVER.—The market strengthened slightly and then began to ease off, closing weak. The demand is only fair both on this coast and at the East. Following is given the average monthly prices of silver for three years:

	1896.	1895.	1894.
January	67.13	59.69	66.63
February	67.97	59.90	63.43
March	68.40	61.98	59.49
April	67.92	66.61	62.92
May	67.88	66.75	62.96
June	68.69	66.61	62.59
July	68.75	66.75	62.45
August	67.75	66.61	61.83
September	65.68	66.90	64.14
October	64.62	67.64	63.06
November		67.40	65.13
December		66.47	60.43

The shipments from London to the East for the year to October 8th aggregated £4,371,177, a decrease of £581,730. The Indian shipments were £3,251,078, an increase of £403,898; the China shipments £574,413, a decrease of £909,311, and shipments to the Straits £545,686, a decrease of £76,317. For nine months ending September 30, 1895, Great Britain imported £7,973,947 of silver, an excess over exports of £297,574. In 1896 the imports were £10,788,570, while the exports were £439,663 in excess of this amount. During nine months of 1896 Great Britain imported £19,946,712 of gold and exported £20,429,414. In 1895 she imported £27,035,412 and exported £15,327,702 gold.

MEXICAN DOLLARS.—There is a light export movement. Brokers quote 51⅛@52c in a small way, but in large quantities from first hands the price is lower.

COPPER.—The demand abroad is simply enormous. The outward movement from this country is restricted by the scarcity of freight room. The home consumption is enlarging. The market is strong and apparently tending up.

Ingot, jobbing	—@14
Ingot, wholesale	—@13
Sheet copper	—@17

QUICKSILVER. — The market is steady with a continued good demand.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

LEAD.—The markets at home and abroad seem to have found bottom and under smaller stocks and improving consumption are firming up.

Our market is quoted as follows:

Pig	—	@	3 75
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is a good seasonable demand.

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

ANTIMONY.—Crude is in good demand and slightly higher. Our market is quoted at 7¾@8½c in a jobbing way. New York mail advices quote 7⅞@8c for Cookson's, 6½@7c for Hallett's and 6⅞@6½c for Japanese, from store.

BORAX.—The shipments by rail to the East are said to be increasing.

The market is quoted as follows:

Refined, in car lots	6½
Refined, in sacks	5¾
Powdered, in car lots	5¼
Concentrated, "	5⅝

TIN.—Pig is firmer in sympathy with the East. Plate is steady with firmer feeling.

Pig, per lb	14¼c@ —
Plate, I C coke, heavy, per box	— @$7 05
" " " light, "	— @ 3 95

IRON—The East reports a steadily increasing demand, with the markets firm. With us there is a better demand. It is stated that the consumption in 1897 will probably be the largest in the history of the Coast.

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 0
Gartsherrie	21 50	23 0

Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing	20

POWDER.—The demand continues very heavy with manufacturers having orders ahead which will take some time to fill.

The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, " "	8½c

COAL.—There have been heavy arrivals of foreign, but as yet, no changes in quotations are reported. The bulk, if not all, of the cargoes were placed previous to arrival.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	— —@ 5 00
Cannel	— —@ 8 00
Egg, hard	— —@11 50
Wallsend	— —@ 6 00
Scotch Splint	— —@— —
Brymbo	— —@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	—
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—There is a continued good outward movement.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The demand for the time of the year is said to be exceptionally good.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, Nov. 12, 1896.

Business the past week has been light. On Saturday and Monday there was a slight strengthening in prices, but it soon gave way under persistent selling by the bears. There was a steady, sickening decline up to yesterday when a steadier tone was noted, owing to some outside buying for a turn. That slightly higher prices are near at hand is the growing opinion with the better class of operators. While believing that a higher range of values will rule, still they do not think the market will run away, but, on the contrary, go to very much lower figures before the winter and spring months pass. This belief is grounded on reports that moneyed men who can make a market will not do so now but leave it to small pools, and past experience has shown that the latter are content with a few dollars deal in the shares of from one to three mines that are well in hand. The work on the Brunswick lode still attracts attention, but, to an outsider, it looks very much like the monkey shearing the pig—it is all cry and no wool. The fact that the work is being done in a new lode makes the shares of the mines a gamble. Take, for instance, Chollar the past week. The official letter reports a three-foot vein of $35 ore on the 650-foot level in the Comstock workings, but it had no effect on the market price of the shares. If this ore had been struck on the Brunswick lode the shares would have moved up one or two dollars. The work on the Comstock lode indicates that the most important will be discontinued before long and new work started from which nothing but assessments can be looked for. In the Bodie shares there has been the usual few cents up and down. This is done to concentrate shares.

From the Brunswick lode the news is not of an unfavorable character, although the decline in the market value of shares would indicate it. In Occidental work is continued on several levels, and while nothing of large value has been made public, still those in charge express themselves as well pleased with the general situation. It will take considerable time, work and expenditure of money before definite results can be known with any degree of positiveness. In Chollar connection has been made between the 200-foot level and the surface. On the 300-foot level exploiting work is still the order. The south drift on the 400-foot level has been turned so as to be used as a crossdrift with the view of striking the downward continuation of the ore found above. In Hale & Norcross sinking of the shaft is continued as is the crossdrift on the 400-foot level. When in about 30 feet the ledge was struck and, at last advices, it was being croosscutted to find its value, if any; so far it is disappointing. In Savage and Gould & Curry considerable work is being done, and generally in favorable formations. This work is being closely watched by mining men as is the east joint crossdrift on the 300-foot level in Best & Belcher and Gould & Curry.

Mail and telegraph advices from the Comstock mines are not materially different from last week's published news. The general outlook, judging from official letters, points to longer time and more work before the powers that be are ready to show up much ore. It looks now as if the result of the recent work in two or more of the mines will die a dead secret, so far as the public is concerned, but it is reasonable to conclude that it was very favorable or else it would have been given out. In the Alta group work is only being done by Alta, and this shows no particular change. In Overman a few tons of ore are raised while prosecuting work on second level. No ore was raised the past week by Seg. Belcher. The work that is being done is not reported, and has not been done for many months past. The same remarks apply to Belcher, although the latter raised about sixty tons of ore the past week.

In Crown Point exploiting work is continued in several levels. Seventeen hundred and seventy-nine tons of gold-bearing ore have been milled, which returned about $6 to the ton. This will hardly pay expenses. A small quantity of good ore was milled which returned over $40 to the ton. No advices are to hand from Yellow Jacket. The news from Confidence and Challenge is about the same as heretofore reported. In Con. Imperial they are still pushing the joint Confidence, Challenge-Con. Imperial west crossdrift. Work on the other west crossdrift was discontinued some time ago and work on the north lateral drift from the end of the west crossdrift was resumed. It is said that the ore on this level was taken out through another mine and not accounted for, which accounts for the old fillings found in the drift. In Alpha the work, it is said, is still being done as if not to find the rich gold-bearing ore run into a few years ago. The work in Bullion is essentially unchanged. In Potosi work is continued on the croppings and also on the 450-foot level, but nothing new was reported during the week. In Chollar they are exploiting on the 450-foot and 650-foot levels. On the latter level they are following a 3-foot vein of $30 to $35 ore. The official letters from these two mines, and also from Savage, give the assays in gold and silver, the same as has been done by Hale & Norcross for nearly a year past. This is quite an improvement and not so misleading as when the two metals are given separately.

In Hale & Norcross the work is practically unchanged. In Savage exploiting work is being done on several levels, and it is said that it is quite favorable on one of them. The joint Best & Belcher and Gould & Curry east crossdrift is being pushed steadily ahead. The work under way in Con. Virginia is on the same levels and in the same direction as reported last week. Those directly interested are watching with considerable interest the work to the east on the 1650-foot level and that to the west on the 1000-foot level. The number of tons of ore raised and assay value were less than last week. The work in Ophir is continued on the Central Tunnel and 1500-foot levels. As it is to the west, mining men watch it with close attention, but even there work can be done and no one outside of a very few know anything about it. In Mexican, Union Sierra Nevada, Utah and Andes work is continued on the same levels and in the same direction as heretofore reported, with no marked change in the material encountered reported in official letters.

The following illustrates the changes of the week:

Mines.	Nov. 5.	Nov. 12.
Alpha		
Alta Consolidated	$ 10	
Andes	35	$ 23
Belcher		43
Best & Belcher		88
Bodie		
Bullion	18	15
Challenge		32
Chollar	1 95	1 80
Confidence		
Consolidated California and Virginia		1 70
Consolidated New York		
Crown Point	43	34
Exchequer		
Gould & Curry	72	64
Hale & Norcross	1 30	
Justice		03
Mexican	48	61
Ophir	1 35	1 20
Overman	11	10
Potosi	84	76
Savage	63	62
Sierra Nevada		62
Union	53	49
Utah	12	09
Yellow Jacket	49	45

San Francisco Stock Board Sales.

SAN FRANCISCO, November 5, 1896.

9:30 A. M. SESSION.

100 Andes	23	100 Mexican	61
100 Best & Belcher	88	100 Occidental	31
200 Bullion	14	100 Ophir	1 20
100 Challenge	32	100 Potosi	73
450 Chollar	1 80	100 Savage	62
100 Con Cal & Va	1 70	200 Sierra Nevada	62
100 Crown Point	34	200 Utah	09
300 Gould & Curry	64	100 Yellow Jacket	45
500 Justice	03		

SECOND SESSION—2:30 P. M.

100 Mexican	60	100 Overman	10
200 Gould & Curry	63	100 Union	49
300 Potosi	76	100 Challenge	30
200 Yellow Jacket	44	100 Andes	23
300 Belcher	43	500 Bulwer	42
300 Sierra Nevada	60	100 Best & Belcher	86
200 Bullion	15		

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.	Secretary.
Challenge Con M Co	22	10c	Oct 14	Nov 17 Dec 8	C L McCoy, Mills Bldg
Channel Bend M Co	5	2c	Nov 9	Dec 12 Jan 2	J P Langhorne, 39 Sutter
Goleta M Co	4	20c	Sept 21	Nov 2 Dec 2	D M Kent, 330 Pine
Greenwood G M Co, Cal	1	2c	Oct 16	Nov 23 Dec 14	Chas E Elliott, 309 Montgomery
Horsefly G M Co	1	25c	Nov 4	Dec 21 Jan 20	R T Ward, 610 Clay
Horse Shoe Bar Con M Co	5	10c	Oct 29	Dec 5 Dec 26	D M Kent, 330 Pine
Justice M Co	61	5c	Oct 14	Nov 17 Dec 8	R E Kelly, 309 Montgomery
Marguerite G M & M Co	4	20c	Sept 21	Nov 10 Dec 15	Chas Peach, 237 12th
Mexican G & S M Co	55	20c	Oct 9	Nov 12 Dec 3	Chas E Elliott, Nevada Block
Minaret M & M Co	1	½c	Oct 9	Nov 15 Dec 1	Geo R Armstrong, 309 Montgomery
Montecito M Co	3	15c	Sept 21	Nov 2 Dec 2	D M Kent, 330 Pine
Mt Diablo M & M Co	5	10c	Oct 27	Nov 30 Dec 21	R W Heath, 318 Pine
North Gould & Curry, Nev	17	10c	Nov 4	Dec 5 Dec 22	C H Mason, 337 California
Potosi M Co, Nev	46	25c	Sept 28	Nov 4 Nov 24	Chas E Elliott, Nevada Block
Savage M Co	90	20c	Oct 2	Nov 4 Nov 24	E B Holmes, Nevada Block
Silver King M Co	15	25c	Oct 26	Dec 7 Jan 5	J W Pew, 310 Pine
Sterling M Co	3	15c	Sept 21	Nov 2 Dec 2	D M Kent, 330 Pine
Thorpe M Co, Cal	4	5c	Oct 14	Dec 12 Jan 9	A F Frey, 567 Market
Yellow Jacket S M Co	61	25c	Sept 11	Oct 15 Nov 20	W H Blauvelt, Mills Bldg

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Occidental Con M Co	Alfred K Durbrow, 309 Montgomery	Nov 16

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ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Occidental Consolidated Mining Company will be held at the office of the Company, Room No. 69 Nevada Block, No. 309 Montgomery street, San Francisco, California, on MONDAY, the 16th day of November, 1896, at the hour of 1 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Friday, November 13, at 3 o'clock P. M.

ALFRED K. DURBROW, Secretary.

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Assessment Notices.

CHALLENGE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 14th day of October, 1896, an assessment (No 22) of Ten (10c) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 35, third floor Mills building, corner Bush and Montgomery streets, San Francisco Cal.

Any stock upon which this assessment shall remain unpaid on the 17th day of November, 1896 will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 8th day of December, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. McCOY, Secretary.

Office—Room 35, third floor Mills building, corner Bush and Montgomery streets, San Francisco, Cal.

THORPE MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 14 h day of October, 1896, an assessment (No. 4) of five (5c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No 507 Market street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 12th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of January, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—No 507 Market street, San Francisco, Cal.

GREENWOOD GOLD MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Greenwood, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 16 h day of October, 1896, an assessment (No. 1) of two (2c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 79, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23rd day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 14th day of December, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. E. ELLIOT, Secretary.

Office—Room No. 79, Nevada Block, No. 309 Montgomery street, San Francisco, California.

GOLD RIDGE CONSOLIDATED MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 20th day of October, 1896, an assessment (No. 5) of two and one-half (2½c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 21st day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 14th day of December, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

WM. F. McLAUGHLIN, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the Thirteenth (13th) day of July, 1896, the several amounts set opposite the names of the respective shareholders as follows.

Names.	No. Cert	No. Shares.	Amt.
E. C. Cain	170	2,500	50 00
E. C. Cain	171	2,500	50 00
C. L. Dingley, Jr.	72	800	16 00
C. L. Dingley, Jr	73	800	16 00
Gen. O. D. Greene	18	10,000	200 00
E. C. Godfrey	169	3,803	76 06
E. C. Godfrey, Trustee	160	6,667	133 34
E. C. Godfrey, Trustee	166	1,333	26 64
E. C. Godfrey, Trustee	167	1,809	36 18
E. C. Godfrey, Trustee	141	1,667	33 34
E. C. Godfrey, Trustee	142	3,000	60 00
W. H. Gregory	153	500	10 00
H. T. Holmes	75	470	9 40
E. H. Hawkins	76	470	9 40
Wm. Jones	77	470	9 40
G. B. Libby	83	2,000	40 00
J. F. K. Landis	138	1,000	20 00
C. A. Moore, Trustee	103	7,222	144 44
C. A. Moore	102	7,222	144 44
Percy P. Moore	117	6,000	120 00
Percy P. Moore	118	7,222	144 44
Percy P. Moore, Trustee	130	468	9 36
Jos. A. Pratt	1	2,500	50 00
Jos. A. Pratt	2	2,500	50 00
Jos. A. Pratt	3	2,500	50 00
Jos. A. Pratt	54	2,500	50 00
John E. Todd	5	2,500	50 00
John E. Todd	6	2,500	50 00
John E. Todd	9	2,500	50 00
John E. Todd	55	2,500	50 00

And in accordance with law, and an order from the Board of Directors, made on the 13th day of July, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38, Crocker Building, San Francisco, California, on MONDAY, the 21st day of September, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, Room 38, Crocker Building, San Francisco, California.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until WEDNESDAY, October 21st, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California. E. C. GODFREY, Secretary.

POSTPONEMENT.

Upon resolution of the Board of Directors of the Gold Bar Consolidated Mining Company, the day of sale for the above delinquent stock was postponed until MONDAY, November 16th, 1896, at the hour of 2 P. M., at the office of the company, Room 38, Crocker Building, San Francisco, California. E. C. GODFREY, Secretary.

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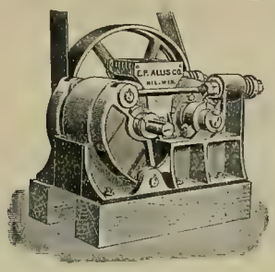

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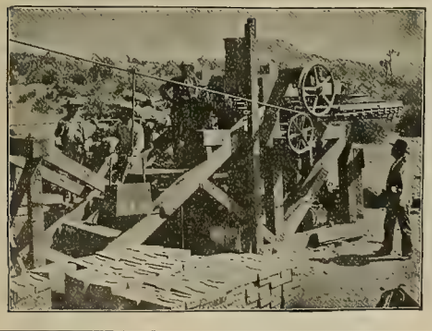

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AND PACIFIC ELECTRICAL REVIEW.

No. 1898.—VOLUME LXXIII. Number 21. SAN FRANCISCO, SATURDAY, NOVEMBER 21, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Confusion of Mining Laws.

Almost universally favorable comment is noted in the journals of this State regarding proposed changes in the mining laws submitted by the MINING AND SCIENTIFIC PRESS to the California Miners' Convention. In a very few a wrong impression is given of their object. In the Redding *Free Press* it is claimed that "their practical effect would only add to the complications that already exist," and that "there is no class of our citizens who are confronted with so much unnecessary red tape in securing title to any part of the public lands as the miner."

The locator now is surrounded with more red tape than he would be under the proposed laws; but it is red tape cut up into short bits that he is unable to put together. Under the present system of locating mines in California, some things that are considered necessary to be done have been declared useless by the courts. Other things that the locator considers of little importance have been declared by the courts as vitally necessary. Then again the decisions of the courts have been conflicting, and the result is that no one knows just what should be done.

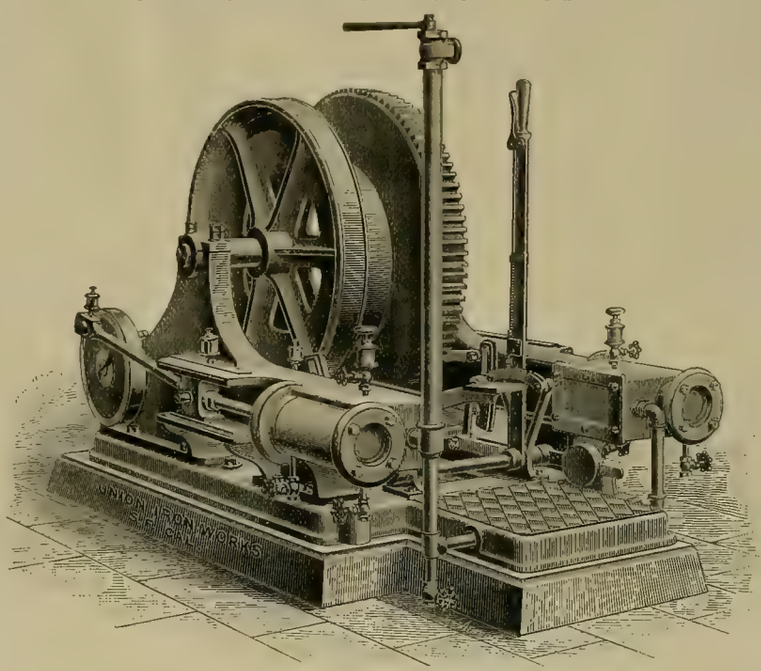
This is best evidenced by the fact that the MINING AND SCIENTIFIC PRESS has been called upon for many years to answer more inquiries on this subject than upon any other.

For example, the locator looks upon the posting and recording of the notice as one of the best evidences of his title. Yet the Supreme Court has lately held that in the absence of State or district laws no such notice is necessary.

The want of State laws on the subject of locations has left the locators to their own devices. The result has been a most fruitful source of litigation, most of which would have been avoided by statutes of the State covering the points that the Federal statutes expressly invite the several States to cover.

As to the proposed laws in this respect, we believe that they are as simple as they can be made and yet comply with the Federal statutes in the case.

To comply with the requirements proposed would give no more work to the locator than the present system. And, what is of more consequence, when he had complied with the proposed law, if passed, he would feel a sense of security that few locators have now. Under the present system locating is largely done by guesswork as to what is or is not really necessary to be done. The Federal statutes provide in a very general way that certain things shall be done in a manner to be prescribed by the State or local rules and customs. The State has not prescribed the manner in which these things shall be done, and in most mining districts of the State there are no local customs now in force. The Federal statute is so very general that not only has there been doubt and confusion among the miners as to what is required, but the courts themselves disgree upon many points. If there is any advantage in security of title to mining property, some laws such as are proposed are a necessity.



HOIST FOR PROSPECTING.

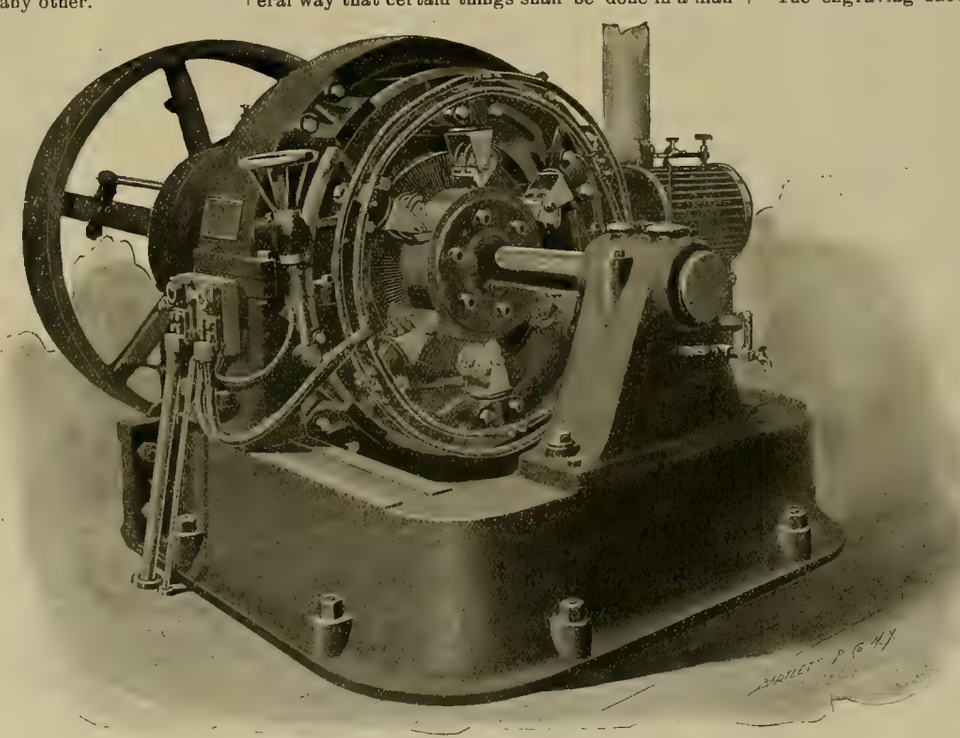
Prospecting Steam Hoist.

We illustrate on this page a small double cylinder, single drum hoist for prospecting purposes or for underground work, using compressed air. The entire hoist is self-contained, being mounted on an iron sole plate or bed, which carries all the operating levers and provides a foot board for the operator.

The engines are provided with reversible link motion and the drum with a broad strap brake, insuring safe and rapid work. The general lines upon which this hoist is designed are neat, strong and substantial, and all the operating parts seem to be conveniently arranged. The illustration is taken from the 4-in.×10-in. size, rated at 15 H. P. The larger sizes, 8-in.×12-in. and upwards, are provided with post brakes.

Generator for Isolated Lighting.

The engraving shows a new style generator for isolated lighting plants, designed by the Walker Co., Cleveland, O., direct connected and of the multipolar type: the bed of the engine and the generator are one casting. The pole pieces receiving the coils are of laminated wrought iron, cast welded into the frame. The machine does not dispense with a pole shoe as is done in some dynamos having laminated pole pieces, but has a shoe which is claimed to distribute the magnetism properly through the armature, minimize the power necessary for the magnets and form a supply for the field coils, enabling them to be easily removed.



GENERATOR FOR ISOLATED PLANTS.

In the Kootenay district fully five times as many mines will be in operation this winter as last. Rossland has grown in one year from a town of 2500 to a city of 7000. Trail has grown in the same period from 100 to 2000. Burton, Waterloo and Deer Park were unknown on the map last spring.

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Our latest forms go to press on Thursday evening.

J. F. HALLORAN.....General Manager

San Francisco, November 21, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Hoist for Prospecting; Generator for Isolated Plants, 417. Multiple Drilling Machine, 422.
EDITORIAL.—Confusion of Mining Laws; Prospecting Steam Hoist; Generator for Isolated Lighting; Mining Activity in British Columbia, 417. How a Secretary of Mines May Be Secured; The Proposed "Placer" Law; What Cheap Methods Mean; Morality of Miners; The Mine Owner and Government Bureau; Local and Foreign Investors; Mining Laws in Alaska, 418.
MECHANICAL PROGRESS.—Multiple Drilling Attachment; Shotgun Barrels; Compressed Air on a Warship, 422.
SCIENTIFIC PROGRESS.—Pneumatic Tubes in the Postal Service; Making Diamonds, 422. Tricks of Ancient Gold Workers; A Remarkable Institution; To Convert Fahrenheit into Centigrade Degrees, 423.
ELECTRICAL PROGRESS.—Niagara on Tap; New York and Brooklyn Tunnel; A Noiseless Electric Motor, 423.
PRACTICAL INFORMATION.—Cost of Labor Wars; The President's Term of Office; The Government's Coast Defense Guns; A Large Timber Area; A Recollection of Ancient Literature; To Restore Burned Steel Tools, 423.
MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 426-7.
THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 434.
MISCELLANEOUS.—Concentrates, 419. The Relation of Geology to the Development of the Mineral Resources of the State, 420. Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process, 421. Dredging versus Impounding Debris; It Does Not Pay, 422. Coast Industrial Notes; Personal, 425. Prof. Emmens' Discovery; List of Patents; Notices of Recent Patents, 428. Recently Declared Mining Dividends; Recent California Mining Incorporations; Commercial Paragraphs, 435.

How a Secretary of Mines May Be Secured.

The movement for the establishment of a Department of Mines in the Federal Government is gaining strength daily. Good work has been done in this State by the Miners' Association; the newspapers are taking up the matter, notably the *Call* of this city, and from the interest manifested it may safely be said that California will do her share toward accomplishing the end in view. A joint resolution will be presented to the Legislature when it meets in January, recommending that Congress take action. In the Northwest the Mining Association and the press are doing all that could be expected. The papers in Colorado and other States in which gold and silver mining is the leading industry have fallen into line.

But this is not enough. What is wanted, and what will insure the success of the movement, is the co-operation of the great mining industries of the East. If the States in which coal, iron and copper mining are leading industries would see to it that their representatives in the House and their senators vote for the measure, it would pass with little opposition.

The value of the coal product of Pennsylvania in 1895 was over $36,000,000; of Illinois, over $16,000,000; of Ohio, over $12,000,000; and of West Virginia, Alabama, Iowa, Indiana, Washington and Colorado, over $4,000,000 each. The leading States in the production of iron were Pennsylvania, Ohio, Illinois, Alabama, Virginia, Tennessee and New York. Michigan produced over $20,000,000 worth of copper.

A concerted movement on the part of the States named would be all that would be required.

The Proposed "Placer" Law.

Land Commissioner Lamoureux's decision in favor of the Northern Pacific against a placer claimant promises to give him some discomfort during the short session of Congress. Since we called attention to the case, and presented the proposed bill for remedying the evil which the Commissioner is striving to accomplish, the newspapers all over the West have given the matter consideration and heartily endorse the movement to clip his wings.

The other day Senator Teller of Colorado, in speaking of the decision of the Commissioner, said that the former rulings of the Land Office which have been reversed in this case have been in existence for the last half a century, and that he could see no special reason for the position taken by Lamoureux.

"I have no doubt," said he, "that if the bill proposed by the California miners comes before Congress to put the practice of the department into the form of statutory law it will be passed, unless the Secretary of the Interior should reverse the decision of his subordinate. It has always been customary to put sulphur, borax, alum, kaolin and like minerals not in place under the provisions of the laws governing placer claims, and I fail to see any reason why they should not be still maintained in that category. The bill will certainly receive attention if it comes before Congress."

What Cheap Methods Mean.

It is probably no exaggeration to say that but for the reduction in the cost of mining and milling brought about by new methods within the past ten or fifteen years more than half the mines in the world now being worked would never have been opened. On the Rand in South Africa much of the ore that is being worked to-day would not have paid under the methods in vogue three years ago. There the cost of working tailings by the cyanide process has been almost brought down to 50 cents per ton on the larger plants.

In his address before the Miners' Convention Prof. Christy of the State University said: "And this much is certain, that any mine owner who is discharging tailings averaging over 50 cents a ton would do well to save them." A few years ago such a statement could not have been made.

Aside from the fact that the reduction in the cost of working ores gives a larger profit to the mine owner there is a much larger view to be taken of the matter, and it is that the reduction in cost has added countless millions of wealth to the world in making of value immense ore deposits that were before worthless.

Many millions, of course, have been irretrievably lost in the past through the crude methods of working. Much has gone off in the tailings and much ore that would now pay to work has been left in the old workings of the mines, where it cannot now be reached, owing to the breaking down of the ground.

Colorado miners estimate that there are $30,000,000 in low-grade ores on the dumps that will now pay to work. All over this State a great deal of such ore is now being worked at a profit.

Morality of Miners.

A man who claims to have visited British Columbia during the past year writes to the Liverpool *Post* to warn English girls against emigrating to the mining districts of that province, and says:

The inhabitants are chiefly men of the lowest possible type, who gain a livelihood by gold mining, and vary their occupation by following the profession of gamblers. The astounding number of drinking saloons in proportion to the population, which one invariably finds in these towns, is a sufficient proof even to a casual visitor of their bad character, but the real depth of their vileness can only be fathomed after a considerable stay. They are then found to be veritable dens of iniquity—foul blots on their magnificent surroundings, and certainly not the places where we would wish our sisters to find husbands.

Such a palpable, bald slander, if published in this country, where the character of the gold miners is so well known, would not be taken seriously. But, published in one of the most reputable of the great English dailies, it may do considerable harm.

The gold miner of the Pacific coast of to-day has many of the characteristics that won for the men of '49 the respect of all who understand them. This is especially true of the miners in the newer districts. Probably the fact that the miner does his drinking and gambling openly, and not secretly, will impress the casual visitor wrongly. The honest miner is in the habit of doing all things openly and allowing the world to judge him by all he does, rather than trying to show only his best side.

The Mine Owner and Government Bureau

The United States Geological Survey has for several months had a corps of surveyers about Butte, Montana. In order to make a thorough examination of the mineral deposits of the great copper district and obtain the desired data it was necessary that they should be permitted to examine the mines. In most cases this permission was freely given. It was with difficulty, however, that the privilege was finally obtained from one or two of the largest mines. In this State the Mineralogist in his annual report tells of considerable difficulty experienced by his field assistants in obtaining access to the mines during the past year. In many cases, and particularly large mines, they were absolutely refused permission to make examinations.

It is from such sources that the most valuable data may be obtained by geological surveys and mining bureaus. Information so gathered would be of practical use. Were there any good reason for refusing permission to the surveyors to examine the mines, the owners who refuse might be excused. But there is not. The information required is mostly obtained from the older workings and there is no need for the surveyors to gather and publish any information except such of a general nature that could not in any way affect the mine owners' interests.

It has been suggested in this connection by the State Mineralogist that a law be passed compelling the mine owners to allow access to the mines. Such a law would be of value only as to a very small proportion of the miners of this State, for it seems that very few upon a proper understanding of the matter would object.

There is no desire on the part of the Mining Bureau or the Geological Survey to pry into any of the private affairs of the mine owner, and they should certainly know that the Bureau and the Geological Survey are engaged in work in their interest.

Local and Foreign Investors.

The advent of the foreign speculator for the purpose of purchasing California mines is looked upon with alarm by some, who believe that a large proportion of the best mines will soon be taken up and owned abroad. It is unfortunately true that too large a proportion of the mine owners would rather sell mines than work them. Then, of course, many of them have not the necessary capital to properly develop their properties. However, there has been a large increase within the last year of that best class of miners—men who are looking for mines to work for the profits to be made, rather than for speculation. They, and not the speculators, are the men who will do most for mining and who will add dignity to the calling.

The great change in sentiment in reference to that industry that has taken place within the past few years is best illustrated by the San Francisco "down-town business men." A few years ago an offer of a mining investment to one of these men would have made him throw up his hands in horror. He would explain that he never gambled.

Now all that is changed. More money has probably been invested in the mines of this State within the past year by San Francisco business men than by any other class. They have learned that mining may be conducted as any other legitimate business enterprise, and the fact that they have learned this means much for the future welfare of the industry, and particularly for the welfare of California. It means that not only a large proportion of the profits of the mines will remain at home, but, more than that, it means that mining will be conducted as it should be, by careful and conservative men, who are looking for investment for their money in a business that, economically and carefully managed, will give them large profits. They will be much more interested in new methods of mining and milling than in the machinations of stock dealers or promoters.

The day of pure speculation in mining is fast passing away the world over. The big English syndicates which are looking for mines to offer in the London market expect to buy only mines which they can practically guarantee to their clients. The good work done for English syndicates by California engineers, and the splendid reputation they have made as a class for integrity, has given them a standing in London that enables them to do much toward turning capital to this State. It is to be hoped that this new interest of foreign capitalists will further stimulate local capital to rival them in seeking investment here.

THE general mining laws of the United States have been for a number of years extended to Alaska, but not so with the general land laws; and it is practically impossible to perfect title to any ground except mineral in that country.

Concentrates.

TEN stamps will soon be added to the mill at the Bigelow mine at Sierra City, Cal.

CAPTAIN T. H. MERRY of Hueneme, Cal., recently discovered a gas well off shore in that vicinity.

THE Denver *Mining Industry and Review* reports an "exodus" from Colorado to Mexico since the election.

DURING October Cripple Creek, Colorado, incorporated mining companies paid dividends aggregating $168,000.

M. MCVEIGH, owner of the Live Oak mine in Clapboard gulch, Amador county, Cal., is arranging to erect a mill.

BUT forty-one days remain in which to do the required $100 worth of work or improvements on unpatented mining claims for 1896.

THE resumption of work at the borax mines at Calico, San Bernardino county, Cal., will cause the employment there of 200 men.

CONSIDERABLE success in working the mines on the Colar gold fields has attracted attention to India as a field for exploration.

THE Director of the United States Mint estimates that the world's output of gold for 1896 will be $220,000,000—an increase over last year of $17,000,000.

THERE are 438 stamps in present operation in Alaska. The '95 gold output of the Territory was $3,000,000. The estimated output of '96 is $4,500,000.

A COMPANY with a capital of $100,000 has been formed to work a gold mine discovered near Paris, Texas. There is considerable prospecting going on in the neighborhood.

EXPERTS have been making examination of W. E. Chapman's Taylor mine in El Dorado county for English capitalists. It is reported that the mine has been offered for $500,000.

IT is generally of much more interest to a mining man to read of the discovery of a 10 or 20-foot ledge of $10 ore than the reports of small ledges that go away up in the thousands.

ON the Rand, in South Africa, the natives are rebelling against the reduction in wages decided on by the mine owners and many are asking for passes in order to leave the districts.

AN order has been issued in the District Court of Arizona permitting the sale of the Vulture mine under the terms of a trust deed given by Senator Tabor of Denver for security on loans of $23,000.

COLOMA, in El Dorado county, where Marshall made the discovery of gold in California, is now noted as the center of a small district from which come the best peaches shipped to Eastern markets.

IT is expected that the Colorado Eastern railway will soon run into the Yellow Pine mining district in Lincoln county, Nevada, where, it is said, it may obtain nearly 1000 tons of ore daily for freight.

THE California Exploration Company will soon supply Mokelumne Hill, which is within a mile of their plant, with electric lighting. The ground has been surveyed and stakes set as far as San Andreas.

LAST week at the annual meeting in London of the Con. Gold Fields Co. J. H. Hammond, the company's general manager, made a favorable report on deep level mining in the Rand, South Africa, district.

THE estimated copper output of the State of Montana for October is between 20,000,000 and 25,000,000 pounds. Of this the Anaconda is credited with 10,000,000 pounds and the Boston & Montana with 5,000,000 pounds.

ON Rogue river, in southern Oregon, Newell and Iliff have purchased heavy pumps to force water from the river direct against their gravel banks for washing. Two such plants were in successful operation last winter.

OIL PRODUCERS of southern California are looking forward to better prices. They claim that the product will soon fall below the amount desired for consumption unless new territory is developed more rapidly than during the past few months.

AFTER the adjournment of the miners' convention in this city last week a number of delegates from different parts of the State went up to Grass Valley and Nevada City as guests of the Nevada county delegation to visit some of the large mines.

THE Anaconda Copper Mining Company paid a dividend of $1,500,000 last month to its English shareholders, who purchased it for $34,500,000. Now it is reported in Montana that before the end of the year a dividend of $3,000,000 will be declared by the company.

CRIPPLE CREEK, Colorado, is expecting a boom from an influx of outside capital. It is claimed that brokers are besieged with orders for properties to be placed in the East, and that there are a number of English, French and German investors now in the camp.

ON the last pay day the forces of miners in the principal Gold Hill, Nev., mines were reduced as follows: Crown Point from 72 miners to none, only watchmen are now in charge; Belcher from 33 to 16; Confidence from 9 to 8; Challenge Con. from 5 to 4; and Con. Imperial from 8 to 7.

IN the past two years twenty-five hydraulic mines have been started up in Plumas county, all with storage dams, all working successfully. This means a great deal for that section—money coming out of the ground, ready cash market for products, schools, civilization, industry.

THE Anaconda, Montana, copper mine is announced to overtop all previous records in mine dividends by declaring this month a dividend of $1,500,000, recalling the days when in this city Con. Cal. & Va. declared a monthly dividend of $2 on each of the 540,000 shares of stock.

LA MADRUGADA, in the Topia district, Durango, Mexico, is said to be enjoying a boom. It is estimated that the value of the ore in sight is over $5,000,000. The company owning the mine contemplates building a narrow-guage railway from a point near Topia to Culiacan, capital of Sinaloa.

ACCORDING to the annual Blue Book on the mineral statistics of Great Britain the value of all the lead, zinc, copper, tin and other metallic ores except iron did not exceed £750,000, and the *Mining Journal* says in this connection that British metal mining is, therefore, in a dying condition.

UNDER the laws of Russia all gold and silver mined must be registered and taken to the Imperial mint, which has agencies established for convenience in collecting. The mines are the property of the crown, and a certain percentage goes to the Imperial treasury. The result of this is that more or less is concealed; yet the production last year was placed at $34,000,000. In most of the rich districts the methods employed are very crude. To remedy this a number of experts have been called upon from California and other places to go there of late.

TO CORRECTLY approximate the number of mines, mills and working miners in the State is not practicable. The lists published in these columns in serial form from April to September, '96, indicate that there are about 18,000 miners in the State, about 3,300 mines and 600 stamp mills, comprising 6,500 stamps.

LEADING mine owners and managers of Colorado propose organizing a State Mining Association. The Colorado plan embraces the idea of having none eligible for active membership but those actually engaged in mining, which is not without its advantages. The headquarters of the Association is to be in Denver.

THE laws of Montana provide that the Secretary of State shall charge 50 cents for each $1000 of capital stock of any corporation filing its certificate. In order to avoid this, companies have been organizing with a capital of a few thousand dollars, and shortly afterwards increasing the capital to the desired amount.

THE Mines Department of the New South Wales Government offers a reward of £500 for the discovery of a new gold field, provided that within six months not less than 300 miners shall be profitably employed in it. In case there are 500 miners at work within twelve months, an additional £500 reward will be paid.

THERE have of late been more than the usual demands for placer miners for South America. Robert Williams, a brother of Gardiner Williams, who has charge of the Kimberley diamond mines, left some weeks ago. R. O. Laws has gone from Trinity county, and now Henry Meegan, who has been mining on Snake river in Idaho, has gone to Venezuela.

THERE has never been any law, any statutory provision, against hydraulic mining in this or any other State; a decree of a court and injunctions under that decree have interfered with operations of hydraulic mining in this State, the miners in general complying therewith, but, thank Heaven, hydraulic mining is not "illegal" in this commonwealth.

IN a gravel mine at Cherokee, Butte county, the owner claims that owing to lightness and toughness of the ground he washes it four times. The first washing only brings from $4 to $5 to the man per day, but the second about $7 to the man, and the third from $6 to $7 to the man per day. The tailings are left to dry out well and after wheeling 1000 yards a fourth washing yields $3 to $4 to the man.

A CORRESPONDENT of the *Wall Street Reporter* writes from Durhamville, New York, of the discovery of gold quartz veins there, lately mentioned in this column, which show assays running from $25 to $900 per ton. He says that he has thirty-two claims in St. Lawrence county and has discovered mines enough in the State to flood the gold market for ten years. He admits that the statement may seem incredible.

GREAT SALT LAKE, Utah, has for several years been furnishing a good part of the surrounding country with salt. Lately the salt company, while driving some piles, discovered a stratum of sulphate of soda, or glauber's salt, with a slight mixture of silica, which can be easily separated. It is claimed that there is sufficient quantities to make the discovery of value. Most of our sulphate of soda comes from Europe.

FROM February 1, 1896, to November 1, 1896, there were coined at the United States mints 16,262,922 standard silver dollars from the silver bullion on hand purchased under the act of July 14, 1890. The seigniorage upon this amount was $5,051,430. Silver bullion purchased under the act of 1890 on hand November 1, 1896, was 125,061,263 fine ounces, which cost the Government $112,865,625. The coinage value of this amount is $161,693,000.

REPRESENTATIVES of Barney Barnato, the South African mining king, are reported to have secured control of practically all the mining property in Lake of the Woods and Rainey River districts in northwestern Ontario. Mr. Barnato denies the statement. Whether Barney Barnato is behind the men or not it is certain that representatives of English capital have gone to those districts to secure control of properties, attracted by the representatives of some leading Canadian mining men.

THE last three payments on the Prize mine, in Deer Lodge county, Montana, which was sold some time ago by the Murray brothers to Irwin C. Stump and others, was made on November 3d, and the property is in the hands of the new owners. The purchase price was $45,000. This is a mine that was offered in London a few months since for £150,000, or, rather, shares were offered at that rate in a company formed to purchase and operate it. Of this sum, £120,000 was to go to the vendors and £20,000 for working capital.

THE Miners' Protective Association of Tuolumne county offers a standing reward of $150 for evidence that shall lead to the conviction of any person for stealing gold dust, amalgam or quicksilver from any mining claim, tunnel, sluice, under-current, riffle-box or sulphuret machine, the property of any member of said Association, and a reward of $50 for evidence that shall lead to the conviction of any person for stealing from any mining claim belonging to any member of the Association tools of a value under $50.

THE Cowenhoven Railway Tunnel and Drainage Company of Aspen has been incorporated, with a capital stock of $1,000,000, for the purpose of completing the Cowenhoven tunnel from Smuggler mountain to Lenado, the principal mining town of the Woody district, on the Aspen contact. From there a road is to run northeasterly to the town of Thomasville, to a junction with the Colorado Midland road in Pitkin county, thence northeasterly again to the town of Minturn in Eagle county, and to a junction with the Denver & Rio Grande road. In addition a branch line will be built from Thomasville to Ruedi in Eagle county.

ACCORDING to a late estimate in the Alaska *Mining Record*, the output of gold in Alaska this year will be over 50 per cent larger than last year, when it was about $3,000,000. The total for this year is placed at $4,670,000, of which $2,355,000 comes from quartz mines and $2,450,000 from placers. While these estimates are probably rather high, there can be no doubt that there has been a large increase over last year's output and that a further increase will be noted next year. Not only are a number of large, new quartz mines being made productive, but the placers will no doubt be worked more systematically and intelligently. Of the large number of people who went to Alaska last spring many will not go again. Their absence will not be a drawback. Of those who will go up in the spring, there is every indication that a larger proportion will be intelligent miners, prepared by experience and equipment for good work.

UNIVERSAL attention is being directed to the revival in gold mining. The famous article on "The Flood of Gold" is being copiously paraphrased. It is not likely, however, that there will be an immediate demonetization of the yellow metal. In view of this increase, the position of silver is interesting. On one side it is argued that silver will increase in price through a change in ratio, and ultimately recede under the stimulus of "overproduction;" on the other hand, there are many who hold that silver will exhibit a constantly appreciating ratio with gold. Above and beyond ordinary "political" questions, these matters have the most important bearing on the world's commercial destiny.

THE Canadian Government is doing good, timely work in the way of making examinations of the mining districts of British Columbia. W. A. Carlyle, the Government Mineralogist, published a short time ago a report upon the mines of the Trail Creek district, and has lately been on the Slocan and about Toad mountain and other localities. R. G. McConnell of the Dominion geological survey department has been examining the geology of certain parts of the Kootenay country. While Mr. McConnell is examining the geology Mr. Carlyle has been examining more particularly the mines themselves. One of the main duties of Mr. Carlyle's office is to collect and publish reliable statistics of the products of the mines.

A BILL has been drafted by the Minister of Mines of Victoria, Australia, providing for the expenditure of £140,000 by the Government to assist in the development of mining. According to the provisions of the bill, £75,000 may be set aside for assisting companies which are doing pioneering work, but only £25,000 can be spent annually. The money is to be expended in sinking or driving, or in obtaining machinery and appliances for carrying on such pioneering mining. For each pound of assistance received the companies must expend a pound of their own money. The repayment of this is to be made a charge on the first profits. Part of the rest of the proposed appropriation is to be used for an ore-testing plant.

THE Volksraad of the Transvaal has passed two laws that are apt to stir up considerable opposition and may cause trouble if enforced. These are the press law and the expulsion of aliens bill. By the press law it is enacted that in future all articles appearing in Transvaal newspapers must be signed by the writers, and any newspaper can be at once suppressed by the President and Executive Council should they deem it obnoxious to the State: and by the expulsion of aliens bill the President and Executive Council have the power to summarily put over the border any burgher or Uitlander making himself politically obnoxious to the State. It is claimed that both these laws have been passed in defiance of the constitution.

THE cyanide process can be applied with success for the treatment of free-milling ores in which the gold occurs in fine particles, or of tailings and concentrates resulting from wet-crushing and copper-plate amalgamation, or dry-crushing and pan-amalgamation. It can also be used for the treatment of refractory ores in which the gold is so finely divided that even pan amalgamation fails to recover a profitable percentage of values; or of ores in which the gold is coated with a film of metallic oxide or sulphide. All the common ores of silver are soluble in dilute cyanide solution. The rate of dissolution of silver ores is, however, much slower than that of gold. The distinguishing features of the Siemens-Halske process are the use of extremely dilute solutions of cyanide, and electrical precipitation of the gold.

COAL mining is promising to become an important industry in Arizona. In the northeastern part of the territory extensive bodies of bituminous coal are encountered north and east of the Painted desert region. This coal crops out in many places, and at one point has a thickness of 23 feet. The San Carlos coal lands lie east of the Painted desert tract, and extend northeast into Colorado and New Mexico. It comes to the surface in many places, and as far as now known consists of three stratas, the first two having a thickness of four faet while the last and lower one is often found 15 feet in thickness. One thing which has prevented the development of the San Carlos coal measures is the fact that is covered by the Indian reservation, and unless some steps are taken by Congress no work can be done.

THE Mountain Mines, Limited, of Shasta county seems to have entirely overcome all the difficulties of smelting they at first encountered, and are successfully working about 150 tons of ore per day with their big blast furnace and some 200 stall roasters which have lately been erected. All the ore except a small proportion of siliceous ores from other mines for fluxes comes from their own property on Iron mountain. A second blast furnace is being built and it is the present intention of the company to build four or five altogether, and erect 400 or 500 stall roasters altogether. A statement made in the MINING AND SCIENTIFIC PRESS of September 26th as to the proposed number of roasters was questioned at the time as being excessive. There are employed at the mine about 125 men, and at the smelter in operating and construction work about 250.

A PHILADELPHIA paper states that it is reported on good authority that a large company has been organized to promote a system of gold mining without removing the ore from the earth. The scheme as applied to gold mining is to sink shafts a few inches apart and pump into them a suitable dissolvent. A strong electric current is then to be passed through the soil between the shafts. The action of the electric current is claimed to be that it will carry with it the dissolved gold from one shaft to the other and deposit it there on any metallic circuit in the same manner as electro-plating. The successful mining of sulphur in what is called a somewhat similar way in Louisiana is quoted as giving some reason for thinking the gold mining scheme feasible. But the case is very different. In Louisiana the valuable deposits of sulphur are covered with quicksand and many unsuccessful attempts have been made to reach the sulphur. The attempt was made to freeze the quicksand, and for this purpose a giant refrigerating plant was set up, but without success. Then a Cleveland inventor offered the proposition to sink a 4-inch pipe, and inside of this a 2-inch pipe, and to melt the sulphur by forcing down steam under pressure and allowing it to expand at the bottom of the well, and pumping out the molten sulphur through the small 2-inch pipe, as is done in certain salt wells worked on a similar plan. This scheme worked successfully and is now in operation, sulphur 99 per cent pure being obtained, which is allowed to cool in vats and afterward cut into suitable blocks.

The Relation of Geology to the Development of the Mineral Resources of the State.*

By HAROLD W. FAIRBANKS, PH. D.

The science of geology has for its object the study of the earth. It attempts to unravel its history from the earliest times of which we can gain any record, and traces downward to the present the development and modification of its various physical features, as well as the complex life which has gradually grown up on its surface.

On the one side this science is studied more directly for the added knowledge which it gives us of the world processes. On the other side, there is the practical aspect, which deals with the varied needs of the individual and of society. These two—the practical and the purely scientific—are inseparable in many of their applications.

There is needed first the most careful and scientific work along lines which, taken in themselves, do not seem to have any practical bearing in order to develop those results which can be turned to some end which is useful in aiding the onward march of industry.

The science of geology is made possible because of the uniformity in nature's processes. Chemical and physical forces have never ceased their action upon the earth since it was first formed, and it is through a knowledge of these forces going on to-day that we can determine what took place in ages past. The degredation of mountain ranges, the deposition of their material upon the bottom of the ocean in regular order and the growth and modification of life is but the present aspect of an almost infinite series of similar changes.

The regular succession of strata, the younger above the older, and the steady growth of higher and still higher forms of life, as represented by the fossil remains in these strata, are among the most important means by which we are enabled to intelligently unravel the complicated history of our earth.

At first sight it does not seem of any practical use to spend so much time in classifying the rocks and arranging them in their proper sequence by the aid of the animals and plants entombed in them; but study, as well as practical experience, has shown that it has a most important use. Different mineral products are found in different portions of this series of rocks which it is the problem of the geologist to classify according to their age and character; and when we have successfully outlined the structure, character and extent of the different rocks of successive periods, noting the conditions under which they were formed and the disturbances which they have undergone, we are in a position to intelligently direct those searching for valuable minerals, thus saving them time and money.

The Carboniferous period is the one so productive of coal in the Eastern States, but in California the strata of the same age are totally barren, so that it is forever useless to expect to find the best quality of coal in California. A knowledge of this important fact is due to the work of the paleontologist, and has been determined only by the means of a thorough acquaintance with the fossils of the coal periods over the whole world. We ought to appreciate the facts which we apply so easily to-day to the solving of such practical questions which have taken scholars and investigators of the pure science years of research to reach. The organized study of geology has been largely carried on and brought to its practical applications through the instrumentality of geological surveys. These surveys have been undertaken and supported by appropriations from the local governments.

Since geology began to assume the character of a science, surveys have been initiated and carried on by all civilized governments, and to their systematic investigation is due much of the successful effort for the development of the mineral industry. The geological survey has, then, in the first place, for its object the study of the different kinds and groups of the rocky strata exposed in the crust of the globe. It investigates the extent and structure and mineralogical character of each.

The deposition of most minerals is usually the result of volcanic or other violent disturbances of the earth. Thus conditions for their formation have existed at different places in different periods. Each mineral is often associated with certain portions of the country or with certain formations, and it is the business of a geological survey to point out the regions where such and such minerals are liable to be found and by careful study determine the extent and character of those already known.

I do not mean to make light of the debt which we owe to the prospector. Without his patient searching much of our present wealth would have remained hidden in the ground. His work and that of a geological survey are different, and the one can learn from the other. A knowledge of the principles of geology which govern the character of ore deposits would, however, have saved the prospector many a weary search and wasted energy. As a general thing, it may be said that the principles governing the deposition of minerals are dependent for their action in a high degree upon the nature and structure of the country rock.

Since geological surveys were organized fifty years ago they have grown in number and importance, fulfilling a need of our civilization which nothing else has been able to do. In many of the Eastern States the great expansion of the mineral industry is directly traceable to the work of the geological surveys. Geological mapping is being carried on over a large part of the world and will doubtless be continued for generations.

If States like New York, New Jersey and others whose mineral resources are comparatively limited can find it profitable to maintain geological surveys for many years—that of New York continuously for over forty years—it can be readily seen what an enormous advantage it would be for California, whose area, as well as mineral resources, is so much more important.

Although one of the leading States in the Union in wealth and natural resources, California has done comparatively little in systematic survey work. The science of geology has so advanced that to-day it is only careful, detailed work which can in reality be very profitable. We have now a general working knowledge of nearly the whole State as the result of the investigations of different organizations, chief among which is the State Mining Bureau. The latter institution has done some good detailed geological work upon the old river channels and in portions of the chief gold areas, yet circumstances have made it impossible to do more than reconnaissance work over the most of the State.

Although the former survey was discontinued because of the feeling that its work was not satisfactory, yet the need of something of the kind continued to be felt, and the State Mining Bureau was organized in 1880.

It was felt that more definite knowledge was needed of the mineral deposits of California, but it seemed best to devote the energies of the institution more directly to the problem connected with mining. In this line a vast amount of work has been accomplished, which has done much to call attention to the resources of the State and stimulate mining.

California is growing and other needs are coming to the front. The extent and character of the coal and oil fields, the demand for good building stone, knowledge of the water supply, etc., are earnestly calling for systematic attention.

The needs of the mining industry are also expanding, so that it is felt that the work of the Mining Bureau must be restricted more closely to that line and give up all attempts at carrying on geological work in connection with that of mining. The work in geology is important, and it is felt that it ought not to be dropped, but that arrangements should be made to carry it on separately in the form of a geological survey, either under the auspices of the Mining Bureau or in any other way in which it can best accomplish what is needed. It would seem that, however, for the present at least, that it could be more economically administered as a department of the Mining Bureau, whose library, museum and laboratory could be utilized. This question is proposed for your consideration.

Before proceeding farther in regard to the functions of a geological survey, I will indicate briefly some of the principles governing the distribution of the natural economic products in California, so as to give a clearer idea of what a survey might accomplish.

The geologist divides the formations represented upon the surface of the earth into the following great divisions, beginning with the oldest: Archæan, Algonkian, Cambrian, Silurian, Devonian, Carboniferous, Triassic, Jurassic, Cretaceous, Eocene, Neocene, and Quaternary. The earlier formations are not well represented in California as far as we know at the present day, and do not particularly concern us. Down to the close of the Jurassic the land area in California was probably much smaller than at present. Then occurred the great revolution, upturning and metamorphosing the rock constituting the auriferous slate series. Before the deposition of the next series of beds called the Cretaceous California's important gold and silver deposits were formed, extending the whole length of the State. As a result of this fact it is useless to prospect in the Cretaceous for valuable gold veins. This condition of things not being generally known by prospectors, they are constantly hunting for "Old Padre mines" in portions of the Coast Ranges where the rocks exposed were mostly formed after the period of mineralization.

The quicksilver deposits date from comparatively recent times, having been formed after the great volcanic outbursts in the Coast Ranges. While this mineral is largely confined to the Coast Ranges, it occurs in small amounts in the Sierra Nevadas.

The principles governing the formation of ore deposits should be understood by all interested in mining. Many have been the mistakes, and many the failures, from a lack of knowledge or appreciation of important geological principles. It should be the province of a survey to dispel the many erroneous ideas current, to examine new mineral districts, reporting upon their extent and value, and in every way possible spread true conceptions among those vitally interested.

The thorough collection of all the rocks and ores of the various mining districts is not one of the least of the functions of a geological survey. Duplicate collections should be made of all important and typical specimens and a suite maintained in the State Museum, in addition to distributing sets over the State in charge of the high schools, or in some other way, so as to be of the widest educational value. In the leading mining centers of the State these collections would be of very great value. This distribution of typical specimens is being done by some of the States as well as by the general Government. The collections from the latter, however, reach only the universities. These collections could be made while the survey was in progress at a very slight extra expense, and I can conceive of no more direct way of informing people in regard to mineralogy and geology.

When we come to a consideration of the deposits of coal, oil, and the question of water supply, it is easy to be seen that their successful exploitation is most vitally dependent upon a knowledge of the economic geology of California, and more particularly of the Coast Ranges. Such knowledge is more necessary in this State in examining deposits of coal or oil than in most of the Eastern States, owing to the immense amount of disturbance to which the strata have been subjected.

The geological structure is exceedingly important when the question of the extent of a coal seam is under consideration, while a correct determination of the age of the rocks showing traces of oil will settle the question as to whether it is advisable to bore at any particular spot.

Workable beds of coal are confined to three different geological formations in California, and the determination of the areas where it may be found should be attended to first. Then there should be taken up a study of the different fields where it is known to occur and the extent and character of the beds determined.

I wish that I could impress upon you the importance of the fact that a thorough knowledge of the structure of the mountainous portions of the State, where coal or oil are known to occur or are likely to be found, is of the utmost importance.

Many times in my examination of mineral deposits in different parts of California have I come across men who have spent large sums of money and months or even years of toil prospecting coal seams, where a little reliable geological information would have shown them the uselessness of it.

Near Goler I once met a miner who had spent all winter at work prospecting a seam of coal of fair quality and which might have been of value in that region if of sufficient extent. Unfortunately, the miner did not notice that the seam of coal was associated with strata which formed only a remnant a few hundred yards in extent, being completely surrounded by the gold-bearing rocks of much greater age.

At the eastern foot of the Santa Ana mountains in southern California there are remnants of coal beds left by erosion. They occur faulted into the range of older rocks and can never be mined profitably. The condition of their occurrence has never been noted by the men who have spent much time and money there.

South of Carmello bay, in Monterey county, there is a coal field, which, although the seam is thick enough to pay well, has only a very limited extent, being surrounded by granitic rocks. Through ignorance of the simple geological principles involved, many thousands of dollars have been spent on roads and tramways and in opening the property. These things are not apparent to the miner who has had no opportunity for acquiring the proper knowledge, and it sometimes happens that even experts, who are supposed to know, have blundered because of their non-familiarity with the local geological conditions.

California needs coal more than anything else, and the question arises as to whether she really possesses beds of much value. While the general impression is that the home supply is limited, we occasionally see descriptions of discoveries which are to revolutionize manufacturing. Notwithstanding the numerous descriptions of the coal beds of California, we know comparatively little in a definite way as regards their actual or prospective value. This question can only be determined by a systematic survey carried on by men who are especially trained in the study of geological structure and of the conditions obtaining in California.

What has been said with reference to coal applies with equal force to the question of the oil supply of California. At the cost of much experimentation and many failures, the oil industry has reached a considerable development, but it could be greatly encouraged by a systematic survey of the whole of the Coast ranges. In this line the State Mining Bureau has recently made a good beginning.

The oil deposits of California are peculiar in many respects, occurring as they do in a very recent geological formation, having no relation to the coal beds.

Eastern experts come here and, ignorant in most

*Read before the California Miners' Convention, Nov. 11th.

cases of the geological conditions under which the oil is found, lead people into spending thousands of dollars foolishly. They neglect entirely the geology of the region where they propose to bore and put down wells merely on the surface indications of oil as shown by seepage. Thousands of dollars have been thrown away the past year in the vicinity of San Diego and in earlier years in the counties farther north, when if a competent geologist had been called in, the efforts would have been discouraged. These borings have sometimes been put down in the proper oil horizon, but no account has been taken of the structure. At other times they have been made in strata which are older and underlie the oil rocks, and, as a result, the deeper the borings go the less prospect of getting oil.

A large number of cases of this kind have come under my observation, and it shows how much the work of a thorough geological survey is needed. There are large areas of the State which are liable to contain oil in paying quantities, and it is important that their study be continued until all are surveyed.

The question of artesian and general underground water supply is an important one in many portions of the State. The available supply, as you know, is dependent in large measure on geologic structure. Practical experimentation will often be successful, but it also involves many failures. It is much simplified if we understand the character and position of the strata.

Building stone is destined to be in much greater demand in the future than it has been in the past, and the question of a supply of good stone of various kinds and within the limits of transportation is becoming more pressing every day. Its importance is shown by the difficulty encountered in selecting suitable material almost every time that a large structure is in contemplation. There is no doubt that stone exists in abundance and of good quality, but the fact must be demonstrated and brought before the public.

Mineral springs abound through the State and are the source of a considerable industry. Their investigation and description would come within the scope of a geological survey, and though it would take time to accomplish, yet the result would be invaluable.

I have enumerated the above as constituting some of the more important lines of research of a survey. There are many others, but they will not be taken up here.

You are all undoubtedly aware of the extensive mapping which the United States Geological Survey has been carrying on for a number of years in the northern and eastern parts of the State. This work is excellent, and I fear that some of you may think that it is not only unnecessary but foolish for the State to undertake to compete with it. As a matter of fact, however, there are large areas which the Government has no intention of examining geologically, and besides the functions of the two organizations are so different that there need be no conflict. There are also a number of good reasons why the State should not be deterred from undertaking a geological survey because of the work of the general Government.

In the first place the maps and reports of the United States Geological Survey are not within as easy reach of those who really need them as the results of the State work would be, and while very valuable, appeal more to the technical man and scientist. The State reports are disseminated among the people as those of the Government can never be.

The collections made by a survey are among the most important means for the education of the masses, but in the case of the United States Geological Survey these are all taken to Washington, where they are practically inaccessible to those who ought to see them. The minerals, rocks and fossils should be thoroughly represented in the State museum so that the character of every county and every mineral district can be readily seen.

Mr. Walcott, the director of the United States Geological Survey, has expressed the intention of confining the work of the survey to special problems. No general mapping will be undertaken by that organization, so that if the State does not take up any geological work the most of its area will not be touched and many important regions and industries will remain almost unknown.

There would be no advantage in the State attempting to remap the area already covered by the Government surveys, unless for the purpose of elucidating some particular economic problem, but, while examining mineral deposits and making collections from all parts for local benefit, should confine its mapping to those regions not included within the former surveys. There are many problems lying more in the domain of economic geology which the State can take up to very much better advantage and with greater profit than can the United States Geological Survey. In fact, many of these have hardly been touched upon by that survey.

Mr. Walcott will be glad to leave to the State investigation all along those lines which it is willing to take up, and there is no need of the surveys conflicting in any way. The lines of research of the two organizations would to a certain extent be different. Plans of work and co-operation can certainly be agreed upon to the benefit of both. The work of the United States Geological Survey is excellent as far as it goes, as those of you know who have examined the maps they are making at present, but it would be decidedly unfortunate if it should result in the State making no effort of its own. As you know, the reports of that survey do not circulate among the people as those of the State do, and they would remain as ignorant as before upon those questions concerning which they need information. There is also a loss of State pride and individuality.

As citizens of a State possessing exceedingly varied and valuable mineral resources our local pride should lead us to maintain a rank with other States, and to support a center of science and economic investigation.

There is one line of work associated with a geological survey, and on which its success depends, which the State can profitably undertake in conjunction with the general Government. This is in the production of accurate maps, on which the topography is indicated by contour lines. The United States Geological Survey has been empowered to undertake topographic mapping in the different States where it is asked for by the latter, the expense to be divided equally between the State and the general Government. I have the word of Mr. Walcott that such an arrangement can be entered into in California. The State will have the privilege of printing all the maps it needs from the plates which are prepared by the general Government, and at no extra expense. Those of you who have seen the maps issued from Washington, and covering much of the gold belt, know how valuable they are.

Small areas have been mapped topographically in the Coast Ranges and in the southern part of the State, but it is not the intention of the Government to extend these greatly unless the State will step in. When the great importance of these maps becomes generally known the work will undoubtedly receive such support as to insure its completion over the whole of California. We have all had experience with the poor maps now in existence. There is so little accuracy in some of the county maps that for many purposes they are of little value.

These topographic maps form the only basis for an accurate geological survey, but in addition they are of the utmost value to the surveyor and engineer. While all the natural as well as artificial features are indicated on these maps, the contour lines indicating different elevations enable the most unskilled person to trace out the course which a road or ditch would have to follow without expensive surveys.

I would respectfully suggest that the recommendation of the State Mineralogist concerning the mining and geological work be taken under advisement by a committee who should be entrusted with power to make recommendations for the necessary enactments during the coming session of the Legislature.

The survey might perhaps be organized to the best advantage as a department of the State Mining Bureau. In this case the expense would be less and it could occupy rooms in a portion of the same building and have the benefit of the museum and laboratory. It should be empowered to undertake topographic mapping in conjunction with the United States Geological Survey. Then, as the funds might permit, there should be undertaken the plotting of the different formations, with reports describing the extent and charater of their various mineral contents. During this work collections of rocks and minerals should be made for the State museum and for exchange.

There has been carried on in former years, partly under Prof. Whitney and partly under the auspices of the State Mining Bureau, a large amount of reconnaissance work, so that we have now a general idea of nearly the whole State. As a result of this fact we should not have to lose any time, but could get down to productive work immediately. We are in a position now to do thorough and valuable work as a result of this general knowledge.

The large preliminary geological and mineralogical map which the State Mining Bureau issued six years ago is now, owing to the rapid strides which our knowledge has made, entirely antiquated. It is known now to be sadly inaccurate in regard to the rock formations shown, as well as in regard to the occurrence of minerals. We should not delay entering upon a correction of this map, if we would have the reputation of the State along scientific and industrial lines maintained.

If we had to begin with a very modest appropriation, I believe the work would meet with such favor as to ensure its continuance and expansion. California is a very large State, and, of course, to do any really valuable and permanent field work, only small areas could be covered each year. A part of the moneys might be devoted to the mapping of important localities and a part to more general problems connected with the distribution of minerals over the State as a whole. California contains as intelligent a class of people as any State in the Union and will, I believe, appreciate the results of a survey carried on in a thorough manner. Geology is becoming more accurate in its methods every year, and a geological survey at the present day cannot help but return many times its running expenses to the State each year.

Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process.*

NUMBER III.

By H. VAN F. FURMAN, Denver, Colo.

Total Acidity.—The sum of the tests shown gives the total acidity, but as this is frequently all that is required, it may be determined as follows: Introduce 10 grammes of the pulp into a stoppered bottle with some water; add a measured excess of the caustic soda solution; agitate for twenty minutes, and then titrate back with deci-normal acid solution.

The soluble acidity is due to salts with an acid reaction, such as ferrous sulphate, zinc sulphate, copper sulphate, etc., or to free sulphuric acid from the decomposition of pyrites, tellurous acid, etc. It may be overcome by giving the ore a preliminary wash with water. This washing is followed by treatment with a weak solution of caustic soda or caustic lime, which neutralizes the latent acidity due to basic salts. The amount of alkali necessary is determined from the quantity of deci-normal soda solution used in the above experiments. Unless the ore contains a large amount of free acid, the preliminary washing with water may be omitted, the total acidity being determined and reported in terms of lime. Sufficient lime is then added to the ore, before crushing, so that it becomes thoroughly incorporated before the ore reaches the tanks, and when the tank is charged the cyanide solution is at once admitted.

II.—TEST FOR THE CONSUMPTION OF CYANIDE.

The original strength of the stock solution being known, it is only necessary to determine its strength after it has been used on a lot of ore to arrive at the consumption.

Introduce 20 grammes of ore (treated with a sufficient quantity of soda or lime, if necessary,) into a glass-stoppered bottle; add 40 c.c. of the cyanide solution, and agitate for twenty minutes; filter; measure off 20 c.c. of the filtrate and determine the amount of undecomposed potassium cyanide remaining in the solution according to Test 6. The difference between the amount of potassium cyanide in 20 c.c. of the stock solution and the quantity found above gives the amount consumed by 10 grammes of ore.

If the consumption of cyanide is not excessive (which will depend altogether on the value of the ore, as rich ores can stand a much higher consumption than those of lower grade), or, say, not over 4 pounds of potassium cyanide per ton of ore, the following extraction tests can be proceeded with.

III.—TESTS FOR THE PERCENTAGE OF EXTRACTION.

Generally two series of tests are made: by agitation and by percolation.

Agitation.—Take four 4-ounce, wide-mouthed, glass-stoppered bottles, place 1 assay ton of pulp in each, then add to each 60 c.c. of solution of the following strength respectively:

To No. 1	0.1	per cent	KCN.
" 2	0.3	"	"
" 3	0.5	"	"
" 4	0.75	"	"

Before adding the cyanide solution the proper quantity of neutralizer, as determined by Test 1, is added. Allow the bottles to stand for forty-eight hours, with occasional shaking. Filter off solutions; wash with water up to original bulk; test an aliquot portion of the solution for loss of cyanide; dry the tailings; crush them to 100-mesh, and assay. From the assay of the original pulp and the assay of tailings the percentage of extraction can be calculated.

Another method, preferred by some, is to assay the tailings and also assay the solution (see Test 11); then

$$\text{Percentage of Extraction} = \frac{\text{Assay of Solution} \times 100}{\text{Assay of Solution} + \text{Assay of Tailings.}}$$

For quick results the bottles are placed in an agitator, which is revolved for twenty-four hours.

Several agitation tests can be carried out in this manner, varying the quantity of cyanide solution used and the mesh of ore (10, 20, 30 and 40 mesh).

Percolation.—For these tests a glass percolating jar provided with a false bottom covered with a double filter paper will be found convenient. Place 1 pound, or more, of the pulp (with the proper quantity of the neutralizer thoroughly mixed with it) on the filter, and add to the charge 230 c.c. of the stock solution for each pound of ore taken. Allow the solution to macerate for twelve hours, and then percolate gently for thirty to forty hours. Wash with water until the filtrate reaches the original bulk. The rate of percolation may be noted here.

Test the solution for loss of cyanide; assay an aliquot portion of the solution and the tailings, and thus determine the percentage of extraction.

A series of tests may be carried out in this manner, varying the strength of the cyanide solution, the fineness of the ore, and the time of contact from twelve to seventy-two hours.

*Transactions Am. Inst. M. E., September, 1896.

(*To be Continued.*)

Dredging versus Impounding Debris.

TO THE EDITOR:—Although not a delegate to the State Miners' Convention, I am just as much interested in its proceedings. In one of the daily papers of to-day's issue is an interview with Gen. Tolman of El Dorado county, in which he says: "The way to settle the hydraulic mining proposition is to allow every man to mine as he formerly did and let the slickens go to the river as before, and assess the hydraulic miners so much per cubic yard to pay for the operation of dredgers and sand pumps to keep the river free, and to charge so much to the owners of swamp lands for reclaiming them, etc."

Gen. Tolman's idea is very good, as far as it goes; but it seems to me that the Federal Government should bear some of the expense of keeping the rivers open in connection with the miners, and no doubt it would, and this State, also, for it has already made a generous appropriation for the purpose of building restraining dams.

Your correspondent has had considerable experience in hydraulic mining, brush dams, elevators and the care and disposition of debris in general, both in this State and in foreign countries, and does not hesitate to say that the dredging proposition is the only true solution of the disposition of tailings coming into our navigable rivers. I advanced this idea to some officers of the Anti-Debris Association a few years ago and it met with no objections at that time.

Most hydraulic miners know that the Caminetti law is of benefit to a mine only when the conditions are favorable, and not all gravel mines, by any means, are so situated as to be able to impound their tailings economically; but all mines would be able to operate as before if the dredging methods were adopted; and the expense of dredging, pumping, etc., being borne by all, would be brought down to a minimum for each.

I do not think it is fair to make "fish of one and flesh of another." Therefore, the drift and quartz mine owners, and, in fact, everyone else who dumps a cubic yard of earth into the navigable rivers and their tributaries, should be made to pay for that cubic yard. The hydraulic miners should not be made to bear all the expense.

Brush dams are good as long as they last, but sooner or later they will wear out, if there is any water at all, and the friction between miner and farmer will break out afresh. Again, there are very few brush dams in the State sufficient to restrain all the estimated pay gravel above them. There is a limit to which the height of dams can be built with economy, and then mining must cease, with perhaps only half the mine worked out. It is a rich mine, indeed, that can afford to construct a dam with masonry, and a great many mines are situated far from both rock and brush suitable for dams. No serious complaint has been made about boulders or coarse material in our rivers. It is sand, and there are dredgers that handle several thousand cubic yards of sand per hour. With waste tule lands for a dumping ground, we would soon have far better lands for agricultural purposes than the miners are washing away, and if everyone who is interested would pay his just share of the expenses, I believe it would be the cheapest way to dispose of the tailings. It would benefit the rivers, the miners, the farmers, the merchants—the whole State—and would be of incalculable value all round. At least, I think the project is worth serious consideration. H. P. GORDON.

1109 East 21st street, Oakland.

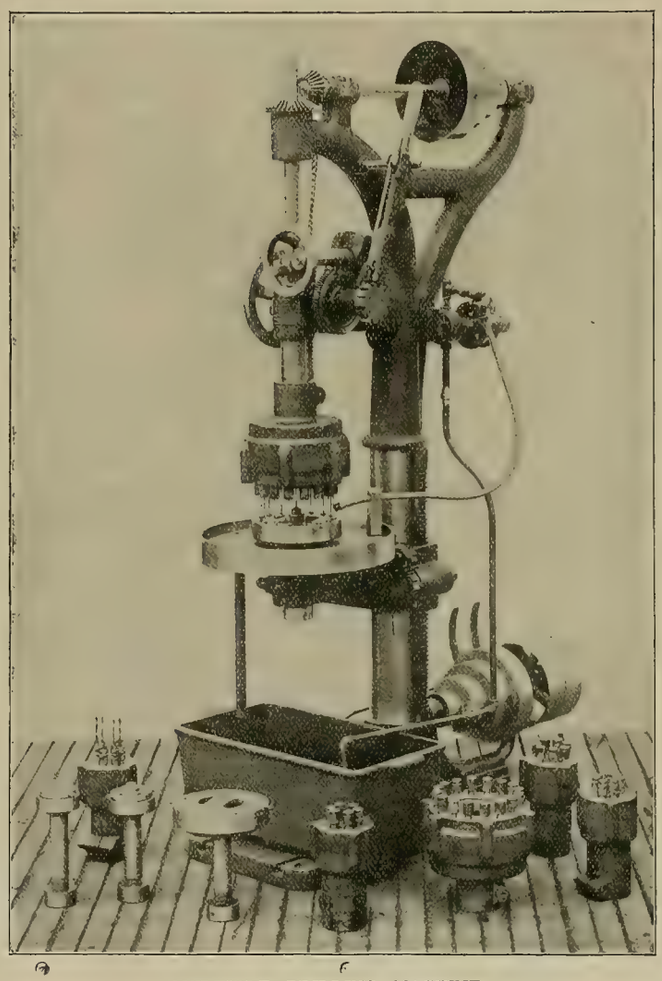
It Does Not Pay.

Don't overwork. As business requires a clear intellect and good judgment to make it a success, these requirements are not likely to be met by those who attempt to master them with fatigued and tired-out brains. Therefore, it follows that the need for recreation is imperative. It may be but a change of thought brought about by the perusal of an interesting book, but nevertheless it serves the purpose well. This thinking business, talking business, eating and sleeping with business will be mighty apt to bring about the loss of life and business, as the human brain is not made of elastic that never gets stringy, nor is the human form made of such material as to be able to resist whatever inroads may be made upon it. A man whose nerves are strung up to their highest tension is not capable of studying the best interests or giving the best service. Little things that would otherwise not be noticed prove an irritant.

Mechanical Progress.

Multiple Drilling Attachment.

The illustration on this page is from a photograph of a multiple drilling attachment designed by the Davis & Egan Machine Tool Co. of Cincinnati, O., for the rapid production of work requiring a definite number of holes to be drilled and accurately spaced at the same time. As will be seen, various heads are furnished to suit the number of holes to be drilled.



MULTIPLE DRILLING MACHINE.

The machine is a modification of the makers' upright drills, in which the drill spindle is used as a driver for the drills, which are placed in a head attached to the lower end. The work is clamped in a jig, shown in the table, and the drills before touching the work pass through stud guide bushes, which insure accuracy. A special pump is provided to lubricate the drills and the surplus is caught by the rim around the table and returned to the pan beneath.

This attachment can be applied to heavy upright drills or to radial drills for drilling holes up to 2 or 3 inches in diameter. The machine is self-contained, is accurately fitted and sure of continued alignment.

Shotgun Barrels.

Why shotguns should be so expensive compared with rifles is a question often asked. It is on account of the expense of making the barrels. The United States Consul at Liege, Belgium, describes the manufacture of the barrels made there as follows:

"The steel is imported from Westphalia; the iron is manufactured at Couvin. The factories receive their motive power from the River Vesdre. The ingot for the production of the curled damascus, which is the favorite design for fine guns, is composed of about thirty sheets of iron and steel, each having the thickness of 4 millimeters and a breadth of 120 millimeters, which form a square mass about 50 centimeters long, and are enveloped in a box of common thin sheet iron or by small wires at each end. The package thus prepared is put into a furnace and welded together at the lowest possible temperature. Too great a heat destroys the metal and yields a burned damascus, showing a small, if any, design. Each barrel receives 150 welding heats while being forged. If one of these welding heats is unsuccessful, the barrel may be a failure, either by the alteration of the damascene appearance or by a trace of the smallest imperfection in welding. Swedish iron is not used in forming curled damascus—only refined iron of Belgium, which gives a greater contrasting hue to the steel, and can be welded at a lower heat. After the ingot is welded it is rolled into small square rods of 7 to 9 millimeters, according to the design of the damascus desired.

"The rods are then drawn into ribbons by the smiths. The manipulation of these ribbons at high temperature is such that, in a length of one meter, 200 twists are shown. The twisting increases in pitch toward the thinner part of the barrel, which is first formed by winding the ribbons on a mandrel, and welding the coils together at the edges. The barrels are then bored out, straightened, ground to the proper thickness and polished. The joining of the barrels for double-barreled guns is a process requiring great care, as the value of the gun largely depends upon the accuracy with which this part of the process is executed. Each barrel is proved by a shooting test at the manufactory before it is placed on sale. It is said that the annual production of these barrels is 300,000, and that they are exported chiefly to England and the United States."

Compressed Air on a Warship.

The new United States monitor Terror is the only vessel in the navies of the world in which pneumatic power is applied for turning the turrets, working the guns, steering the ship, etc. The other monitors have hydraulic machinery for their turrets and guns, and are steered by steam. The Terror is therefore a practical experiment, whose success may lead to far wider use of the pneumatic principle.

The Terror has two engines for compressing the air—one situated in the hold near the forward turret and the other on the berth deck near the after turret. Either of these, singly, can supply sufficient air, at a pressure of 125 feet per square inch, to operate both turrets, including the guns—a total weight of nearly 500 tons. The compressor takes its supply of air from the chamber in which the engine stands, and compresses it in two cylinders, sending it also through two condensing cylinders, where it is cooled by circulating sea water.

Scientific Progress.

Pneumatic Tubes in the Postal Service.

The Postmaster General's report of the railway mail service for the last fiscal year shows that the expenditures for mail transportation, inland and foreign, was $46,523,932, an increase of over $1,500,000 over the previous year. Mail service to the gold regions of Alaska has been established for the benefit of miners and others there. The pneumatic tube service, which it was desired to establish in Philadelphia, New York and Boston, has not been developed as rapidly as it was hoped, on account of the enormous expense. The permission of the bridge company has been obtained for the construction of a tube between the New York and Brooklyn postoffices, crossing the Brooklyn bridge. The Boston matter is practically settled, as far as the permission of the city council and other interested parties is concerned, and only awaits the signature of the Mayor. It is also hoped that a much greater pneumatic tube service is within the near reach of the department in New York city. The postal service of the United States is far behind that of the leading countries of the old world. This is mainly due to the large extent of territory that is covered, from much of which very little revenue comes in proportion to the outlay. In London and other large cities for many years the pneumatic tube has been in use and has had much to do with the making of the postal system there a marvel to visiting Americans. Generally speaking, a letter may be dropped in one part of London addressed to a point four or five miles away and it will be delivered sooner than a special messenger could cover the distance.

Making Diamonds.

M. Henri Moissan, the French scientist, whose experiments with higher temperatures have been productive of results important to science, delivered a lecture in New York lately, which he illustrated with some brilliant experiments. One of these was the making of a diamond. The surface surroundings among which diamonds are found in nature indicated to him that to force carbon into crystalline form, not only

heat, but great pressure have been necessary. So he reproduced the conditions by fusing iron and carbon together in his devastating furnace and then cooling the mass suddenly; the change in volume of the iron produced the intense pressure required and the diamond was formed—a microscopic diamond, but still a diamond.

Tricks of Ancient Gold Workers.

There is a papyrus which gives recipes for various alloys used in the manufacture of cups and vases, for making gold and silver ink, for gilding and silvering, and for testing the purity of precious metals. Other recipes teach the method of falsifying them by adding baser metals—an operation called diplosis, or doubling, for the mass of gold or silver was doubled, while the color remained unchanged, and as the compiler of the material remarks, a skilled workman would find it difficult, or even impossible, to detect the fraud. The recipes which recur most frequently describe various modes of preparing asem, a word which originally meant a natural alloy of gold and silver known to the Greeks as electron. It was at first looked upon as a distinct metal, was considered sacred to Jupiter, and was designated by the sign of that planet, but at a later period the name was applied to all alloys, and M. Berthelot remarks that in this fact seems to lie the explanation of the origin of alchemy. Both gold and silver could be extracted from genuine asem, and it seemed as though it could be changed at will of the operator into either one or the other; it could also be made artificially by mingling gold and silver, or closely imitated by some of the numerous alloys, eleven or twelve varieties of which are described in the papyrus of Leyden.

PRESIDENT CLEVELAND will this month formally open at Philadelphia the most remarkable institution of its kind in existence—a museum which is designed to contain an assemblage of the natural and manufactured products of all countries of the world. Its object is to stimulate commerce and boom American trade, particularly with South America and Africa. All parts of the United States are interested in the enterprise, to which contributions have been made in one shape or another by cities north, south, east and west. The idea is that anybody who has anything to sell shall be enabled to find out offhand just where and how it is wanted, and the best way to seek the purchasers anywhere on the globe.

To convert Fahrenheit into centigrade degrees the usual custom is to subtract 32 from the reading and then institute the proportion 9 to 5. But the French journal *L'Industrie Electrique* gives a simpler rule as follows: Subtract 32 degrees and divide by 2; then add to this $\frac{1}{10}$ of itself and if further accuracy is desired $\frac{1}{100}$ more. For instance, if it is required to find the number of centigrade degrees corresponding to 72 degrees Fahrenheit, subtract 32 and divide by 2, giving 20; adding $\frac{1}{10}$ more gives 22, and for greater accuracy another $\frac{1}{100}$ gives 22.2. The method is not as simple when applied to the reverse calculation.

Electrical Progress.

Niagara on Tap.

In the journal of the Franklin Institute, T. Commerford Martin, in an article on Niagara and electricity, says of long-distance transmission:

"As to the far-away places, Prof. Houston and Dr. Kennelly have made a careful estimate of the distance to which the energy of Niagara could be economically transmitted by electricity. Taking established conditions, and prices that are asked to-day for apparatus, they showed that even in Albany or anywhere else in the same radius—330 miles from the Falls—the converted energy of the great cataract could be delivered cheaper than steam power. What this enterprise at Niagara aims to do is not to monopolize the power, but to distribute it, and in this way it makes Niagara, more than it ever was before, the common property of the citizens. With both the Canadian and the American plants fully developed, no less than 350,000 horse power will be available, while the stationary engines now in use in New York State represent only 500,000 horse power. Yet the 350,000 horse power is but one-twentieth of the 7,000,000 horse power which Professor Unwin has estimated the Falls to represent theoretically. If the 350,000 horse power were estimated at $20 per year per horse power, and at Niagara should replace the same amount of steam power at $50, the annual saving for power in the State would be more than $10,000,000 per year."

New York and Brooklyn Tunnel.

A corporation has been formed to construct a tunnel to join the cities of New York and Brooklyn to be lighted by electricity, and to contain proper heating and ventilating conveniences. By this scheme from 60,000 to 70,000 passengers can be transported in an hour, and be connected with the various trolley or cable lines at either terminus.

The general plan of the tunnel is to have two tracks in two tunnel tubes, thus making it a four-track scheme. These tubes will be 8,700 feet long, and the dimensions of the two tunnels together will be 45 feet wide. The height all the way through will be 28 feet, and the grade at either end will not be more than 4 per cent. The tunnel will come to the surface at both terminals, so that all cars that converge at the points mentioned will be able to make easy connection with car lines in either city. With the exception of 60 feet in the middle of the river, the road-bed is composed of rock, and will make the plan more feasible than the Hudson river tunnel. Two great shafts will be put down close to the river on its opposite sides, to the tunnel depth, and from these four "breasts" can be simultaneously worked. All the material excavated and raised through these shafts will be carried away by barges on the river. Should it be found necessary to expedite matters by excavating also from the termini of the tunnel, little inconvenience, if any, will be caused to the public, as all the work will be on the company's own land, purchased for terminal purposes. The openings near the river will be, upon completion of the work, converted into ventilating shafts. For the avoidance of the possibility of even fictitious damage claims, the company proposes to procure right of way by purchase wherever the line passes under private property. The cost of this is estimated at $3,500,000. The cost of the Brooklyn bridge was $15,000,000, yet the tunnel proposes to afford more rapid transportation for the total sum of $6,000,000.

A VERY suggestive sight is the long line of steam locomotives which the passenger on the Lake street elevated road in Chicago sees rusting on a siding as he glides past them behind a noiseless, smokeless, sparkless, smelless electric motor. Here, at least, the steam engine has had its day. The discarded machines, thirty or so in number, modern and perfect of their kind, served their brief term well, and are as capable of service now as ever. It was through no fault as steam locomotives that they were dismissed from service into inglorious idleness, but because a better and more economical power in the form of electricity has been discovered. The proof of its superiority must have been conclusive, for the owners of this hitherto unprofitable road, newly and amply equipped as it was for steam service, have borrowed and expended nearly $300,000 in equipping the eight-mile line for electricity. Indeed, the advantages of electric power for light, short-line passenger service have been demonstrated, and the only question now seems to be when this power will be adopted for all train service in cities.—Railway Age.

Practical Information.

Cost of Labor Wars.

While it is true that an industry must prosper or decline as a whole, and that all engaged in the industry must share in the results, it is also true that there must be disputes relative to the exact share for the division between the parties interested.

The tenth annual report of the United States Labor Commissioner makes a detailed report on the subject of "Strikes and Lockouts." The report gives the statistics covering a period of thirteen and a half years from 1881 to June 30, 1894. During that time there is a record of 14,389 strikes in 69,166 establishments, involving 3,714,231 employes, which, with lockouts in 6067 establishments involving 449,927 employes, makes a total of 20,456 disturbances, involving 4,164,158 employes.

The amount lost to the employes in wages by these strikes was $163,807,657, while labor organizations and others contributed $10,914,406, making a total loss to labor of $174,722,663. The lockouts involved a loss in wages of $26,685,516, with assistance rendered of $2,524,298, making a total loss of $29,200,814. Combined, the average loss was $2532 for each establishment, of $47 for each person, making the total of $190,493,173 in all.

An estimate of the loss to employers is given with a total of $82,589,786 in strikes and $12,235,451 in lockouts, making $94,825,237. As only about 45 per cent of the strikes were successful, more than half this vast sum was a positive loss to labor, and the whole may be considered as lost beyond recovery to the industries involved. All this only goes to show the supreme folly of arraying interests against each other that should be combined. There are, no doubt, some cases where an actual strike is the only way to test the matter of wages, but such cases are rare indeed, and with an intelligent understanding of the situation this extreme resort is seldom necessary. There are always limits beyond which no employer can go in paying wages, and these limits are determined at the prices at which the products are sold. Labor leaders are, as a rule, too eager to promote strikes without regard to considerations or consequences, and they encourage the idea that employers can always pay any amount that is asked. What is needed is more intelligence and a better understanding of the conditions, as well as the mutual relations, of the interests involved. Disputes can then be settled without resort to such costly and destructive methods

The President's Term of Office.

After every election of President an agitation is started for lengthening the term of office of the nation's chief magistrate, for the reason that a presidential campaign is distracting and depressing to business. This is always true of a presidential contest, but the interference with industry has been particularly marked in the campaign just closed. The usual uncertainty attending the outcome of a national election is sufficient to cause men of capital to hesitate before putting their money into new enterprises or enlarging existing ones. The disturbance to business has been unusually severe during the last summer, because the issue involved was one of tremendous importance to business interests. But the difference between this and other campaigns is simply one of degree. With every recurring presidential election business must suffer more or less.

These contests follow each other too closely. If elections took place less frequently business would be subject to fewer disturbances from this cause. Six years is not too long a term for the President of the United States to serve, especially if it be understood that he shall retire at the end of that time and not seek a re-election to the office. A six-year term would give two presidential elections in twelve years, instead of three, as now. A four-year term is too short. In the early days of the republic the objections were not so great to the shorter term. Now the very cost of presidential campaigns is an argument against having them more frequently than is necessary to enable the Government to keep in touch with the people.

In order to change the term of the President it would be necessary to amend the constitution of the United States, something which it is very difficult to accomplish. But the change is a very desirable one, especially for the business interests of the country, and it is to be hoped that before many years it may be brought about.

The Government's Coast Defense Guns.

Secretary Lamont will ask for $52,975,368 of appropriations for the War Department for the fiscal year beginning July 1, 1897. By that time the Government will have completed coast defenses armed with thirteen 12-inch, thirty-seven 10-inch, eight 8-inch and four rapid fire guns and eighty 12-inch mortars. The extreme range of an 8-inch gun is nine and one-half miles; of a 10-inch gun, eleven and one-half miles, and of a 12-inch gun, thirteen miles. The 12-inch breech-loading mortar fires a projectile weighing 1000 pounds and attains a range of five miles for the cast iron mortar and of six miles for the all-steel mortar. Four out of five shots fired from an 8-inch gun at a range of one mile struck within a rectangle of 20 inches by 21 inches. Of eight shots fired at a range of 3000 yards, six struck within an area of 18 inches by 48 inches.

The 12-inch breech-loading mortar was fired at a range of 2464 yards at a target which represented the deck of the cruiser Philadelphia, lying broadside on, across which, at right angles, was the deck of the same ship lying bow on. In the broadside target there were five hits in five shots; in the bow on target there were three hits in five shots. All the shots struck within a rectangle of 8 yards by 27 yards.

There are now completed sixty-one 8-inch, fifty-six 10-inch, twenty-one 12-inch guns and eighty 12-inch mortars, and in progress of construction twenty-seven 8-inch, fifty-six 10-inch, fifty 12-inch guns and sixty-six 12-inch mortars.

THE district of Archangel, Russia, has a timber area of about 88,000,000 acres, all belonging to the Russian crown, and the revenue therefrom exceeds that from any other government of Russia. Sales by auction take place annually from a minimum price fixed each year. In 1895 the logs sold for about $500,000. There are nineteen large sawmill plants contributory to the White Sea ports. The growth of the lumber business in this section during the last ten years shows considerable progress. In 1886, 1535 men were employed in the mills, with an output valued at $1,300,000. In 1895, 4558 men were employed in the mills, with an output of over $3,000,000.

THE first notice of the barrel found in ancient literature occurs in the works of Pliny, in the first century of the Christian era. When he made his first trip into the Alps, he found the natives using casks and barrels. It must have been a new thing to Pliny, for he noticed it as a novelty. The Romans learned the coopers' art from the inhabitants of the Alps. They must have been quite skillful, these rude mountaineers, for they made barrels that were tight enough to hold liquids. The Romans improved upon the art.

To restore burned steel tools to their former usefulness they should be heated to a bright red and then allowed to cool off in a mixture composed as follows: Melt 500 parts of tallow and 120 parts of black pitch together and add gradually, under continuous stirring, 375 parts of pulverized sal ammoniac, 125 parts of ferrocyanide of potash, 20 parts of soft soap and a handful of common salt. In the case of larger tools, heating and dipping should be repeated.

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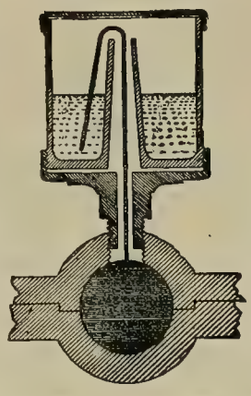

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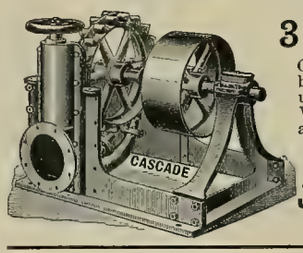

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Coast Industrial Notes.

—The Valley Railroad is to be pushed through and beyond Fresno in '97.

—Don Aureliano L. Torres has ordered in Stockton a large quantity of agricultural machinery to be shipped to Sonora, Mexico.

—Tons of grapes are rotting in the interior of Alameda county because of the lack of highways. Complaint is being made of the condition of existing roads.

—The fleet of the Canadian-Australian steamship line is to be increased by the addition of the Arangi, a vessel which recently belonged to the Orient line of steamers.

—The steamer Mazatlan, which has been plying between San Diego and Mexican ports, and owned in Mexico, was wrecked last week in the Gulf of California. Loss $150,000.

—The Wright Irrigation law has been upheld by the Supreme Court of the United States, thus validating about $8,000,000 bonds in this State and giving legal value to the work, which will now be pushed.

—Disastrous storms have been raging in northwestern Washington and British Columbia during the week. It is estimated that the damage to the railroads alone in western Washington will exceed $500,000. The loss to private property will be nearly as much.

—The Board of Regents of the State University have decided to locate the Wilmerding School, for teaching boys useful trades, in San Francisco. Of the bequest of $400,000, it is estimated that $100,000 will be required for grounds and buildings, leaving $300,000 for an endowment fund.

—A new wooden, screw steamship, being built to take the place of the Humboldt, which was lost at Point Gorda last year, was launched last Thursday. The dimensions of the new Humboldt are: Length over all, 220 feet; beam, 31 feet; depth, 13.7 feet; gross tonnage, about 950.

—The California salt business is still extensive. The bulk of the salt comes from the salt ponds on the eastern shore of San Francisco bay, in Alameda county, where last year it amounted to 48,810 tons, valued at $114,575. San Bernardino produces rock salt which is remarkably pure and the deposits are considered inexhaustible.

—According to the Japanese agents stationed at Seattle, as much as 20,000,000 feet of timber recently contracted for from the Puget sound mills is to be worked into ties with which to transform 2600 miles of narrow gauge railroad in Japan into broad gauge, the necessity for this change having been emphasized by the Japan-China war.

—At a meeting of the Yosemite Valley Commissioners last Saturday the question of raising funds for rebuilding the hotel lately destroyed by fire came up. Governor Budd stated that he would recommend that the Legislature pass a bill enabling the commissioners to borrow the necessary funds from the Regents of the State University.

—The San Gabriel Power Company has awarded contracts for work on their proposed plant and it is understood will expend $750,000 during the next year. A large portion of the power will be used to run the entire system of electric street cars belonging to the Consolidated Electric Company of Los Angeles. Azusa will be the center from which the work will be operated.

—The commission consisting of Admiral Walker and four others recently appointed by the President to locate the deep water harbor at Santa Monica or San Pedro, southern California, met in Washington last Monday to organize and outline its work. Congress appropriated $2,900,000 for the work in connection with the building of a harbor and $50,000 for the expenses of the commission.

—Now that Mexico has adopted the metric system of weights and measures, merchants there will be required to make out their Mexican accounts in kilos, litres, etc. This will facilitate the transaction of business at Mexican ports. In the future freight steamers will be charged by the kilo. One thousand kilos will be called the equivalent of 2000 pounds. This adds 10 per cent to the weight and cost.

—The locks at the cascades of the Columbia river have been formally opened for traffic. The construction of the locks was begun eighteen years ago by the Government, but for many years the work was allowed to drag and little was accomplished toward opening the river. In 1892 Congress placed the work under the contract system. A number of prominent men of Oregon and Washington attended the formal opening. The Government has expended about $2,500,000 on this work.

—There is in California 1,250,000 acres of land suitable for sugar beet culture, most of which averages as well as that near Alvarado, where 3705 pounds of sugar is produced on each acre. This would give a total production for the State of 4,631,250,000 pounds of sugar. For the year ending June 30, 1895, imports of foreign sugar amounted to 3,574,510,454 pounds, valued at $76,462,836. Under favorable legislation California could have produced this sugar, and nearly eighty millions of dollars, instead of being sent abroad, would be distributed among the farmers of this State.

—The Funding bill will come up again next month in Congress. Some mortgage antecedent to the railroad lease should be foreclosed, subject to a plan protecting the stockholding interest. The recent extension of the first mortgage debt has eliminated that security from present consideration as an active element. But the second mortgage, held by the United States, is now in part overdue and unpaid, and is available and enforceable for the common benefit of the Government and the stockholders. It is proposed to utilize this incumbrance to wipe out the lease, to discharge the Government debt, and at the same time to preserve, in full force, the bona fide ownership of the property represented by the present stockholders. To accomplish these results, the stockholders should unite with the Government in the effort to apply all the resources of the property to the payment of the debt to the United States, and of dividends to the stockholders. The first mortgage and Government debts, less sinking funds and proper deductions, aggregate about $70,000,000. The net annual earnings of the aided portion of the road are about $2,750,000. It is proposed to issue new securities for the total of the above debts, to bear 4 per cent interest, thus requiring about the amount of the present revenue for its payment. As the Government claims do not in large part mature before 1898 and 1899, they could be capitalized as of July 1, 1898, and, for the amount so capitalized, the new 4 per cents would be issued, on account of the liability, to the Government. In the bill pending before Congress the Southern Pacific Company proposes to perpetuate its control over the property, without in any way providing dividends. It makes the continued existence of the stock interest dependent upon the Southern Pacific's compliance with its proposed guarantee of certain payments to the Government during a long term of years. If the Southern Pacific defaults on this guarantee, all the Government claims are to mature at once and the most summary measures are provided for their enforcement. The passage of this bill would place the stock in this dilemma: The Southern Pacific Company would retain the property, and, judging by the past, would so administer it that it would never earn more than the amount of its debts, leaving nothing for the stockholders. Furthermore, under this bill, if the lease became abrogated, all the debts to the Government would mature at once, placing the stock in imminent danger of extinction. It is for the stockholders to adopt the alternative of relieving themselves from the lease by utilizing the Government mortgage as proposed above.

Personal.

F. P. SCHUMANN, chief engineer of the Guatemala railroad, is in this city.

OSCAR LEWIS succeeds S. H. Tacy as manager of the Manufacturers and Producers' Association.

HAMILTON SMITH was in Montana last week at the Anaconda properties lately purchased by the Exploration Company.

CAPTAIN THOMAS COUCH has resigned the management of the Boston & Montana properties and arrived in this city last week.

WILLIAM A. FARRISH arrived in this city last Sunday from Denver, where he has been making his headquarters for a number of years.

ROLLIN M. DAGGETT of Nevada, ex-Congressman and mining man, has taken an office in this city and will hereafter make his headquarters here.

W. F. PRISK of the Grass Valley *Union* had an overwhelming majority for the State Senatorship from his district. He will be heard from next winter.

LEOPOLD MEYER of Brussels and his brother, C. H. Meyer of New York, arrived here last Sunday. They are interested in mines in Colorado and in Spain.

SOME months ago Judge Rising of Nevada went to Johannesburg, South Africa, to establish a law office there. He has returned, having found it inexpedient.

L. W. MORGAN, of Morgan & Co., Los Angeles, returned last week from Mazatlan, where he has been examining large silver and gold properties for European syndicates.

HON. WILLIAM L. PUTNAM of Portland, Me., United States member of the Behring Sea Claims Commission, and Don M. Dickinson, chief counsel for the Government, arrived in Victoria last week. It is understood the final meetings of the Commission will be held in this city.

THOMAS COUCH has resigned his position as superintendent and general manager of the properties of the Boston & Montana Company in Montana, and Frank Klepetko has been placed in charge. It is reported that Mr. Couch will sever his connection with all the Bigelow properties, including the Merced mines.

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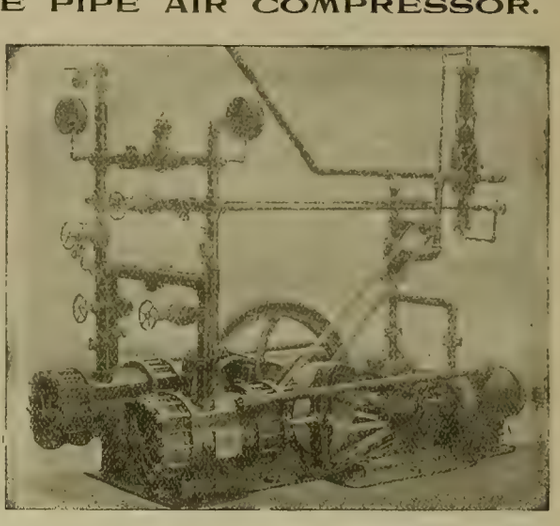

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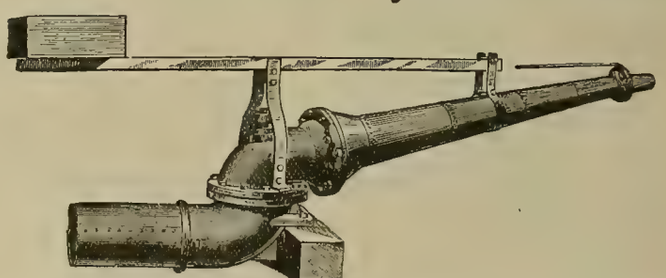

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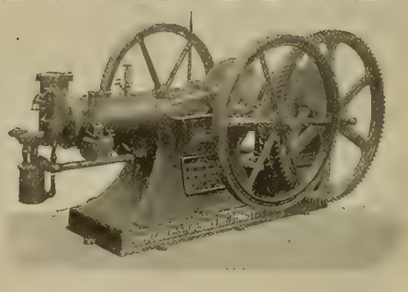

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Mining Summary.

CALIFORNIA.

Amador.

Ledger: The Bailo mining property, which includes the Hayden, Marre and Allen properties on Sutter Creek, is being graded preparatory to erecting machinery. They have ordered a 40-stamp mill, and intend to commence milling from an open cut. They have a deposit 3000 feet long and over 100 feet wide on the surface.

In the Drytown district the Loyal property has been bonded by the Treadwell Company of Alaska.

The Pocahontas and Potosi have been bonded to a company from Toledo, Ohio. At the Pocahontas they have sunk a new shaft about 100 feet.

Many new claims have been staked out on the serpentine ledge west of Drytown.

Five stamps of the Red Hill Mining Co.'s mill have been started up. The other stamps will be ready this week.

The hoist on the old Mechanics mine has been erected, and the water is out of the shaft down to the 95-foot level.

Mason & Griesbach are milling 200 tons of ore in the Gracey mill in Pioneer creek.

The porphyry deposit at the Robinson is about to be prospected by a company of San Francisco capitalists.

Buckman, Brown & Renn of Napa City have, in company with A. B. McLaughlin, arranged to operate the Acme mine property located near McLaughlin's station above Volcano.

Record: The Reward mine at Pine Grove is having ten stamps added to the mill. The new owner, Mr. James, is improving it considerably with an idea of working it to its full capacity.

McVey & Dagoulia will erect a roller mill with a 20-stamp capacity on the Live Oak mine. It is expected to be in operation inside of two months.

The Trask mine will be sold during the week to San Francisco capital.

Matthew Tyler and N. G. Young of the Tennessee mine have sold out to an English syndicate for a consideration of $60,000.

The Eckart mine has been sold to Eastern capital.

The Anaconda mine has also changed hands, the purchasing parties being Denver capitalists, for, it is reported, $32,000.

Butte.

Mercury: Several men have been put to work on the Mattie mine, sinking, the shaft having been pumped out.

New machinery is being added to the Gold Bank mine. The tunnel will be extended.

The 5-stamp mill on the Mt. Ida mine is crushing ore.

Register: At Thermalito Hammon & Quimby have twenty men at work and are using wheelbarrows in moving the large quantity of earth to reach the pay gravel.

Ditzler & Nelson hoist by steam power, while Treat & Co. use steam cars and are now putting in a second line of track for moving the top dirt. The bedrock is from 30 to 40 feet deep and a vast mass of soil above the pay gravel has to be moved.

Grant & Co. will in a short time open a mine near the others. Eighty men are now employed in the three mines which are operating.

Calaveras.

Chronicle: The California Exploration and Development Company have commenced work on a number of their properties in this vicinity. A contract has been let to run 250 feet of a tunnel on the Vair or Gobbi Ranch; a force of men are at work cleaning out and retimbering the old Wesson tunnel on the Maloney Ranch, and men are to be set at work on the Clorac property. At the power plant on the Mokelumne river the work of grading has all been finished and the foundation for the building is now being laid. The building, which is to be of steel, will be 35x100. The plant when completed will cost $126,000.

A cleanup made at the Encino mine after a couple of weeks run was very satisfactory to the owners, and sufficient to establish the mine as a dividend-paying proposition.

Mountain Echo: At the Great Western mine, between Angels Camp and Altaville, owned by Frank Baumhogger, a test of ore has been made, the yield of which was $26.87 in gold and 65 cents in silver. The shaft is over 70 feet deep and the vein or fissure about 6 feet wide. This mine was worked more or less in early days.

Good ore has been struck in the Calaveras mine at Robinson's Ferry.

Citizen: The Womble mine which has been bonded lately, at a depth of 210 feet has struck some rich rock. The vein is 17 feet wide.

The Dimond Jack, owned by J. W. Howard, is down about 50 feet. The ledge is 9 feet wide and rich in free gold and sulphurets.

The Royal has been sold for $300,000.

Angels *Voice:* The property to be worked by the recently organized Kaolah Mining Company includes the Garnett ranch of 100 acres, adjoining the Tryon property on the south, for which $3000 was paid a few months ago. They will commence work within the next sixty days, and will sink a 500-foot shaft.

El Dorado.

Georgetown *Gazette*: C. Keeney is making a number of improvements at the Ohio mine.

At the Blue Gouge mine they are now in 400 feet and getting good pay.

Kern.

Californian: At Garlock, Randsburg district, a well has been sunk and site graded for a new 10-stamp mill. Preparations are being made to put in a cyanide plant to handle about twenty tons of ore per day.

The only mines being worked at present are those producing free-milling ore. There are a number of locations in the immediate vicinity of Garlock of good veins of base ore that will probably develop into paying mines as soon as provision is made to work this class of rock.

At Randsburg there are nine quartz mines being worked at present, the ore running from $20 to $150 per ton and some select ore as high as $800 per ton. The majority of the ledges run from 4 to 6 feet in width, with the exception of one belonging to the Randsburg Mining Company, which is 80 feet wide and is completely uncovered for a length of 300 feet. This belongs to Burcham, Singleton, Mooers and Reddy, along with a group of eight others of less proportions. They are sinking on five or six of the leads. One is already down to the depth of 100 feet.

Los Angeles *Herald*: The total number of men working in all the quartz mines is seventy-six, not including the foremen. There are a number of men working in placer diggings with but little success, most of them making below $1 per day, using dry washers for separating the gold from the gravel.

The strip of country monumented for mining purposes is about eight miles wide and about fourteen miles in length. Everything is located regardless of whether there is anything in sight or not.

The great drawback to the camp is the lack of water. The nearest point where it can be produced is fourteen miles. Water hauled into Randsburg sells for $1.50 per barrel. The nearest point for milling ore is thirteen miles, where there is one mill with two stamps and another with four stamps, and they are unable to run steadily for lack of water. These mills are at Garlock. There is a small 5-stamp mill at Mesquite springs, sixteen miles from the mines. There is also a 5-stamp mill at Kane springs, about twenty-six miles away. All combined are not capable of crushing the ore that is being mined in that district. The population of Randsburg is about 500.

Mariposa.

An English company, it is reported, will soon acquire a group of about sixty claims, four of which are old mines which formerly paid well, and are all near the town of Hornitos. They were purchased about a month ago, principally from M. L. Rogers, by S. W. Parker of New York, who formed a California corporation known as the Hornitos Gold Mining Company. Its capital stock was placed at $2,500,000. San Franciscans were placed in the directory, Charles Sonntag was made vice-president and general manager and W. H. Chapman was appointed attorney for the company; but Parker remains the principal owner, though now he is about to transfer the control to an English syndicate other than the Exploration Company of London, whose negotiations for the Mariposa grant property have been made public. The chief developed mines in the Hornitos group are the Washington, which was worked as early as 1852 and in which a 1500-foot shaft was sunk; the Quartz Mountain, on which are ten stamps; the Jenny Lind, No. 5 and No. 9, on which $750,000 has been expended at one time or another and on which there is a 30-stamp mill.

Gazette: Nelson, Branson & Valberde have bonded the Westminster, near Cotton creek, to a San Francisco company, who are at present prospecting it. If it turns out satisfactory there will be a mill erected.

The Dorse mine is running in full blast under the management of C. E. Stewart. The main shaft is down about 350 feet, with levels running both ways from 200 to 300 feet.

Nevada.

Union: The Old Home Consolidated mine near Blue Tent is producing some high-grade ore.

G. D. McLean has become interested in the Greenhorn mine, and a mill will shortly be put up.

A complete steam hoisting and pumping plant has been purchased and shipped to the Randolph Gold Mining Company's property at the Rodda ranch.

Placer.

Colfax *Sentinel*: The Blue Canyon Mining and Development Company own 1000 acres of the lava-capped ridge below Blue Canyon, and it is supposed to contain more than one and one-half miles of the gravel channel. From the tunnel now being run an upraise will be made at 2000 feet from the mouth.

The California Mining Company at Yankee Jims have finished work in their canyon for the season.

Hoffman & McDonald of Forest Hill have leased and are preparing to hydraulic the Gilbert claim, on Georgia hill, under permit from the Debris Commission.

Plumas.

Independent: Work on the Gold Bar property on the Middle Feather will be prosecuted during the winter. A contract to extend their tunnel has been let by the company. The company have in contemplation the working of the present river bed and the bars where it formerly ran for a distance of several miles between the mouths of Washington and Dogwood creeks. The waters of the Feather river will be utilized for the generation of electric power. The plan of operations comprehends the running of a deep cut from the lower end of the bar upon which mining operations so far have been conducted, to the head thereof; and when the bar has been worked, the rivers may then, if deemed expedient, be turned into the cut and the river bed worked. It is the intention, however, to work the entire river bed and each bar on the property if profitable to do so. Aerial tramways will remove the displaced earth. Should the hopes of the owners of the Gold Bar property be realized, a new field will be opened for the profitable employment of mining capital in our county, as but few of the streams in Plumas, however rich, have been thoroughly mined. Besides, much gold from the hill diggings, suffered to escape by imperfect or insufficient gold-saving appliances, has for many years been finding its way to the rivers and creeks, thus increasing the stores of wealth overlooked and consequently undisturbed by the pick of the early miner.

Marysville *Democrat:* Near Eagleville a quartz lode has been developed, and a company composed of capitalists who reside in Oakland have finished hauling the necessary machinery to erect a good quartz mill on it.

Two miles west of Strawberry valley, C. A. Stratton and associates are developing a quartz lode known as the Berry mine, and it shows free gold in quantities to prove its value. A mill will be erected on this claim next spring when the snow will permit of proceeding with the work.

Drake & Co., on their claim in the Barton House hill, have been nearly two years running a tunnel to develop it. There is a rich bed of gravel where they are now drifting, and in three weeks they washed out sufficient gold to pay half of the entire expense incurred, while the indications promised rich returns in the future.

Shasta.

W. B. Murdoch has sold the Sybil group of mines in French Gulch district, Shasta county, to a New York company, who will work it on a large scale.

Democrat: The Uncle Sam mine, which had been given up as completely worked out by the owners, the Sierra Buttes Mining Company, has again come to the front with a richer body of ore than had ever before been worked on the property.

At one time the Uncle Sam was the best paying mine in Shasta county, but lately had seemed to "peter out," and the large force of men had been gradually laid off until there were but about a half-dozen in number left, and they were employed getting out the machinery preparatory to shipping it to the company's property in Montana.

About two weeks ago Thomas Johns and Henry Rickard secured a lease on the mine for six months, and, after following a small lead for 20 feet, uncovered a body of ore about 4 feet in width, richer than any rock yet found in the mine.

At a meeting of the Sierra Buttes Company lately in London, it was reported that the Uncle Sam mine produced during the past half year 12,995 tons, yielding $58,600, at a cost of $52,770 The original cost of this mine was $150,000, and during the seven years the company has owned it, it has yielded gold amounting to $1,100,290, on which there was a profit of $422,515.

Courier: There is being run by contract a 300-foot contract tunnel on the Flick, Stolberg and Maurer property on Shurtleff hill. The promoters of this enterprise have good encouragement in the way of ore to justify the work.

Free Press: The National Mining Company, at Rich gulch, are increasing their force of miners and will soon run the mill day and night.

E. P. Conner has sold his mine at the Tower house to W. J. Hunt of Sebastopol, Sonoma county. There are two tunnels on the property, each 150 feet long, and the surface croppings are quite extensive.

At Harrison gulch Captain Roberts and Johnny Frank have all the machinery on the ground for a stamp mill, and are still pushing their tunnels and uncovering larger rich ore bodies.

Hurst & Fowler are getting out good ore and developing their property. They shipped ten tons to Selby's at Vallejo Junction recently which averaged about $175 per ton.

Sierra.

Enterprise: The Sierra Gold Company, on the East Fork, are running their quartz mill on ore taken from the large vein. The ledge is 24 feet wide and the ore is said to average $4 per ton.

Mountain Messenger: The owners of the Bigelow mine made a satisfactory cleanup lately. The rock goes $3.50 per ton.

The reduction works are still running at the Young America mine.

At the Chipps mine they are taking out good rock and the mill is being run for the first time in two years.

Siskiyou.

Journal: The ditches and creeks are said to all carry a good head of water, and the smaller placer claims will soon be enabled to start work.

The Seattle Placer Mining Company, on Thompson creek, are about ready to start up work. They have one of the best placer mines in the county, and with the improvements they have put on their property in the past year, the result this season should be far better than heretofore.

The Classic Hill property, a hydraulic mine on Indian creek, near Happy Camp, owned by Mathews & Vogan, has been worked during the past season and is reported to have proved successful. It is a property that requires judgment to handle, as the character of the earth is such that the pipe and machinery may be all swept away by a landslide, unless it is watched.

Etna *Reporter*: The Columbia mine is still in operation, with good ore in sight. The last shipment of bullion for less than a month's run was over $2000.

Mr. Chamberlain has a full force at the Mabel, the mill is kept in constant operation and the rock is yielding well.

Work on the Gumboot mine has been suspended for the winter.

News: The output of Siskiyou's mines next season will double that of any previous season, if indications count for anything. Two large mines, which have not been worked for years, are being fitted up, and several new mines, which have passed into the hands of companies with capital, will be placed in the line of producers. It cannot be said that Siskiyou county is experiencing a boom, but the steady growth of her mining interests has assumed proportions most encouraging to the progressive element.

Trinity.

Shasta *Free Press*: David McCleary of the firm of Bloss & McCleary has sold to James R. Eligh of Redding a half interest in the company's placer mining property of 800 acres of ground, surrounding the town of Trinity Center, including a water right on Swift creek and the ditches, flumes, pipes, giants and other machinery. Mr. Eligh will organize a stock company to continue the working of the property. This hydraulic originally consisted of 2000 acres of gravel, and after having been worked continually for the past thirty-five years there now remain over 800 acres. The purchase price was between $35,000 and $40,000.

Journal: On New river the Sherwood mine is running at full blast, having plenty of water to run the mill.

Clark Butcher, while mining on Kingsbury gulch, Hay Fork, the other day, found a nugget that weighed $14.50.

At Junction City the miners are all waiting for water.

Tuolumne.

Angels *Voice*: The Mammoth mine, at Jacksonville, is turning out $10 ore from a 25-foot vein.

L. W. McClauflin of San Francisco, on Saturday last, paid $2500 for the Homestake mine at Jacksonville. It is between the Mammoth and Eagle mines, both of which are paying properties.

The Golden Gate mine has resumed operations.

NEVADA.

(Special Correspondence).—The Pyramid City camp on Pyramid lake, thirty-two miles northeast of Reno, is again the seat of activity, this time over a gold discovery. The first locations were made by Hank Miller, (one of the earliest Comstock miners) and Antone Dragovich, about two miles south of the old Pyramid City. High value rock was brought to Reno for assay and fully fifty men are now working on this camp, and houses are being built. The whole of the old camp has been relocated. A two-ton mill run made at the reduction works returned $60 a ton gold. This was ore taken from the Miller & Dragovich claim within 6 feet of the surface. The silver was lost in the treatment.

Reno, Nov. 18, '96.

Reno *Gazette*: The Gold Creek (Nevada) Mining Company is developing placer properties in the Island Mountain district, eighty miles north of Elko. They are employing 150 men and a hundred teams, put to work during the last three weeks, and are daily putting on more. They are constructing a storage reservoir that will hold 3,000,000 gallons of water, enough for five months' run in the dryest of seasons. A great deal of the ground being mined goes from $5 to $25 per cubic yard, and the average is sixty odd cents.

The old Dixie mine in Tuscarora, which has has been idle for the past four years, recently fell into the hands of Salt Lake men and is being developed into a fine property. They have erected cyanide plants and mills, which are now running night and day. The company has recently purchased the adjoining ground called the Caprice, paying $30,000 for it. There are other gold properties under bond in the district, and, altogether, Tuscarora is enjoying a gold mining boom which is based upon an actual gold output.

In western Nevada at present for some reason more attention is being given to placer than to vein mining, says the Salt Lake *Tribune*. This is probably because at small cost for machinery sufficient gold to pay fair wages may be quickly obtained. In the western and central parts of Nevada are more placer deposits than was generally known to exist when all come to be looked up. Such of these as are so situated that water may be cheaply brought upon them are being worked more or less extensively. In places, however, there are large areas of placer ground for the working of which water cannot be obtained except at great cost. These our people cannot touch, though some are very rich. In a few places, as about Osceola, there are placers so rich that they are being profitably worked by the use of dry washing or winnowing machines.

Carson *Appeal*: The 200 miners who are going to work on the Cortez mine turn out to be sixty Chinamen.

The Hendra group of gold mines at Dun Glen, has been sold for $20,000, and the new owners are putting up a 10-stamp mill. Several thousands tons of free milling $9 ore is in sight.

F. C. Everett is moving a 10-stamp quartz mill from Alpine county, Cal., to a point near Buck Springs in Smith valley, to work ore from the Top Notch mine and also from the McConnell and Emerson mines.

Pioche *Record*: A mining district has been regularly organized at the Copper mine, about thirteen miles from Bunkerville, in this country, where Stewart and Nay have been for some time past at work opening up what is regarded as one of the best copper properties ever discovered in this section. Stewart and Nay represent Lane and Hayward, San Francisco mining men.

OREGON.

In southern Oregon the miners are much encouraged with the prospect of a favorable season. Some of them have water sufficient to commence work.

A. Lewis has a large force of men at work on the old Taylor Placer Mining and Milling Company property, extending the ditch to supply the mine with water for this season's run.

Twenty tons of silica were shipped from the

Mosier mines down on the Columbia, to Boston, last week. No one there knows what is being received for it. The cost of mining it and delivering it f. o. b., at the Mosier depot is about $12 per ton. The silica mines now give employment to eight or nine men.

Baker City *Bedrock Democrat*: In the Cracker Creek district the E. & E. Con. Mining Company, John Longmaid & Co., lessees, besides keeping their mine and 20-stamp mill in operation, have started a line shaft on the Eureka and Excelsior mines. Immense ore bodies are exposed.

The framework of the new mill at the Columbia mine is finished. It is expected the mill machinery will be in place in the next ten days and the plant ready for operation shortly. The Columbia is an extensively developed property and there is enough ore blocked out for a continuous mill reduction.

The Luverne Mining Company, of Minnesota, recent purchasers of the Ohio mine have commenced mill building.

At the Bananza mine a tramway 2,000 feet long is to be put in, and an electric plant for lighting the mine and mill. New machinery for an additional twenty stamps for the mill is on the way to the mine.

WASHINGTON.

Spokane *Chronicle*: In Okanogan county the Squaw Creek Mining & Milling Company is about to push the tunnel on the Schulz mine in 500 feet farther along their ledge.

The Black Bess, a 6-foot vein of gold and copper bearing quartz, near the Schulz, will be worked all winter by D. H. MacLachlan & Co.

Many new strikes have been made and a wagon road has been built from Methow to Gold creek.

BRITISH COLUMBIA.

Spokesman-Review: An assessment of 1 cent a share has been declared against the stock of the Poorman Gold Mining Company.

The Little Phil, a well-known mine at Ainsworth, has been bonded to H. Clark Wallace for $20,000.

The Republic group of three claims, in the Slocan, have been bonded to Hector McPherson of Brandon, Manitoba, for $25,000, 5 per cent down. Sutherland and Montgomery are the owners.

David Bremner, acting for the Scotch syndicate he represents, has bonded the Wakefield, Ottawa and Cazubaza for $25,000, 10 per cent cash.

It is reported that a deal is on for the sale of the Alpine group of mines, located at the head of Eight Mile creek, on the Slocan divide. The consideration is $80,000. The purchasers are a New York syndicate.

ALASKA.

News: L. Nicolai of Portland, Or., has made the first payment of $15,000 to Frank Bach for the Horrible and Mexican mines on Berner's bay. Mr. Nicolai will continue development work all winter, and as soon as the weather will permit he will begin the erection of a 20-stamp mill. The total investment will approximate $120,000.

The recent addition of sixty stamps to the Mexican mill has so crowded the Treadwell Chlorination Works, which handles the sulphurets from the Mexican as well as the Treadwell, that its capacity has to be increased proportionately. A new roasting furnace is being constructed.

UTAH.

Salt Lake *Tribune*: The Easter, Magpie and Judas, in the Willow creek district, have been sold by D. B. Levan to Col. Dewey for $20,000. A force of men will be put to work, and it is stated that a 20-stamp mill is to be erected on the property as soon as the machinery can be placed on the ground.

At Mercur the Sacramento continues to surprise the camp by the extent and richness of its ore bodies. Another rich face of ore was struck a few days ago which runs over $20 to the ton, with occasional samples which run much higher.

The Geyser also struck a fine body of $16 ore within the last few days, which is showing up well. The Geyser has probably got the cost of mining and milling its ore down to a lower point than any other mine in the camp, although to accomplish this they have had to open up a great many workings.

It is understood that the Sacramento next month will begin paying dividends.

Park City *Record*: The indications are that Park City's list of dividend payers will soon be increased by the addition of the Daly-West and Vallejo.

Prospecting by claim owners in this district, instead of dropping out of sight as predicted, is being prosecuted with the same vigor as of yore.

Bingham *Bulletin*: Bids are being received for the construction of the Highland Boy mill.

The force at the Dalton & Lark has been increased. During the past few weeks a large area of stoping ground has been blocked out and several important strikes made.

John T. Donnellan has taken an option at $25,009 on the Monterey and Iron Duke claims, upon which development will begin at once. The claims are located a half-mile northeast of Silver City.

The mill on the property of the Ophir Hill Mining Company on Lion hill has shut down for the season. The output during the season, that covers a period of less than six months, has been 6000 tons of concentrates, that were derived from 25,000 tons of crude ore.

The Mammoth, on account of extensive improvements being made, has passed its regular dividend.

IDAHO.

The report of the De Lamar Mining Company for September shows: Number of tons crushed (wet), 4,355.13; number of tons crushed (dry), 3,194.64; assay value of the pulp: gold, $12.20; silver, $8.06; total, $20.26; assay value of the tailings: gold, $3.69; silver, $1.81; total, $5.50; percentage saved, total, 72.85; number of ounces pure gold produced, 1,569.327; number of ounces fine silver produced, 39,877.23; value of gold produced (at $20), $31,386.54; value of silver produced (at 65c.), $25,920.18; surplus on bars to date, $1,303.40; ore sales, $5,200; miscellaneous revenue, $295 $64,105.12; deduct all expenses for the month, $44,089.33; estimated profit for the month, $20,015.79.

Inter-Mountain: A dispatch from Wallace says that it is rumored that the Helena and Frisco has been sold to the Standard Oil Company. This is one of the most valuable properties on Canyon creek, employing 125 men and milling 525 tons of ore daily. The mill is one of the most complete in the Cœur d'Alenes. Recent additions to machinery have been made that will increase the capacity until 600 tons can be milled. Monthly dividends of $50,000 have been paid with few intermissions for several years.

MONTANA.

Mining World: The copper claims in the Murray district, Meagher county, are once more being prospected—this time systematically.

The county of Flathead is attracting considerable attention on account of recent discoveries of copper. Metal has long been known to exist in several parts of the county. A new district was discovered the past summer known as the Talley's Lake district. Specimens have been sampled which give assays as high as 60 per cent copper and $5 in gold.

It is stated that the Sand Coulee Coal Company intends to open up the mines owned by it near Armington. The company owns 1,000 acres of coal land on the west side of Belt creek.

About 4,000 tons of coal are produced daily at Sand Coulee and Belt by the Sand Coulee Coal Company and the Anaconda Company, and yet not one ton of this product could be secured for domestic purposes until within the past month when the first named company established an agency at Butte. The entire product of the Sand Coulee mines has been taken by the Great Northern Railway Company, and the Belt output of a hundred or more cars per day goes to the smelters at Anaconda.

Reports have recently been received of important discoveries of copper in Deer Lodge county at the headwaters of the Big Blackfoot river. A Helena company has several men in that vicinity and they have made numerous locations.

SOUTH DAKOTA.

Black Hills *Times*: At the Homestake the new steel tramway from the Ellison shaft to the Golden Star mill is about completed. The bridge portion extends over both branches of Gold run and is over 800 feet in length, with 70-foot spans.

The Highland Mining Company has paid in dividends since January 1, 1896, $120,000 and a total to date of $3,204,900. The Homestake Company has paid this year $312,500 to its stockholders in dividends and a total to date of $6,055,000.

The Pittsburg, Pa., parties who purchased the Amazon group of claims a few months ago are grading for a steam hoist and a residence for their superintendent. At a depth of 35 feet the vein was crosscut and found to be fully 30 feet between well-defined walls.

Rapid progress is being made in placing the machinery and monster Cornish pump at the Union shaft, and it is expected to be ready for work December 1.

On the Union Hill proper the shaft is down 300 feet, on which level 300 feet of drifts and crosscuts have been driven on and in the ore body. The Hoodoo tunnel on the same property is now in over 400 feet and is being advanced to the shaft, which is yet about 700 feet distant. The size of the ore body may be estimated from the fact that the tunnel and the bottom of the shaft are in the same ore body, which, according to mill tests, yields an average of $5 per ton by ordinary amalgamation. It is the company's intention to erect a 100-stamp mill.

COLORADO.

The Pomeroy mine, located above Capital City, was recently placed with Leadville mining men, and its development is now under way.

Ouray *Herald*: Last week the Yankee Boy 60-ton mill, one of the best equipped modern plants in the San Juan, was started up. The Yankee Boy group has in sight 50,000 tons of ore.

Denver *Republican*: As the American patents of the MacArthur-Forrest Company are for the use of a diluted solution of cyanide, and not so sweeping in their nature as the patents involved in the South Africa decision, the verdict of the court in South Africa will have no effect here. The general ground of the American patents was overhauled in the case which was tried last summer in the Federal court at Salt Lake City, where the decision favored the American branch of the MacArthur-Forrest syndicate. In the plant at Florence, the largest of its kind in the United States, patents other than those of the MacArthur-Forrest Company are in use. They belong to Manager Argall and are controlled in this State by the Moffat-Smith Company.

At the Moffat-Bush tunnel, under the south spur of Gold hill, the bore is not yet 2000 feet on its way, but the drain, 2x4 feet in size, is filled within a few inches of the top, and the water coming out would run all the mills the Cripple Creek district needs at present. The tunnel is only approaching the area where pay veins can be expected, and is not more than half way to the Anaconda vein. In the early days it was thought Cripple Creek was always to remain a dry camp, but the number of pumps that are now being required to drain the mines increases the need for large tunnel enterprises such as the Moffat-Bush and others that are now being driven.

Production from the Isabella for October is estimated at 900 tons, of which 475 were of smelting and 425 of milling grade. Partial returns from the smelter on October ores indicate that the values are improving, the ore shipped having an average value close to $70 a ton. The reserve fund in the treasury at present is $60,000.

The Union Gold Company mined twenty-four broad-gauge carloads of ore during October, and the money value net from the smelters is given at $25,000.

Last week the Gold Coin shipped twenty-five carloads of ore, and the production from the three main workings holds steady at about thirty-five tons a day.

Mining Record: Eastern capitalists are negotiating for the purchase of the Bald Eagle mine at Ward.

The Belcher mine, at Carinou, has been sold to John B. Adams of Laramie City, W. H. Smith of Salt Lake and others by J. W. Irwin of Boulder. This property was sold some years ago for $100,000, and during the following year $42,000 worth of ore was taken out.

The Electric tunnel is surveyed to run from Squaw gulch through Bull hill, at Cripple Creek, a distance of 3000 feet. It is intended as a tramway tunnel, and as it will pass through the American Eagle, Favorite, Grouse, Union, Pharmacist, Grotto, Zenobia and other rich mines at a great depth, the revenue from the hauling of ore is expected to pay all expenses and enable the company to pay dividends.

Last month the Florence cyanide mill treated 4000 tons of ore of an average value of 1.07 ounces per ton, making the yield for the month about $82,000. The new roaster adds eighty tons daily to the capacity of the mill, which was previously 120 tons.

Mining Investor: The following are offered as conservative estimates of the output for 1896, of the different mining districts of Colorado:

Clear Creek	$ 500,000
Boulder	700,000
Gilpin	2,000,000
Summit	100,000
San Miguel	3,000,000
Ouray	700,000
Cripple Creek	9,500,000
Lake	1,000,000
Silverton	1,000,000
Total	$18,500,000

The Independence has been shipping heavily during the past month, and it is thought the output will hold at least five tons a day. In the seventh level, from which the ore is now coming, a new chute of sensational ore was entered a few days ago. The mill at the property is shut down, awaiting the arrival of a new and larger pulverizer.

The Anaconda Company has paid off $80,000 in debts since August 1st and are now free from liabilities. They have been spending years in development work, and now have immense ore reserves in sight and can mine at a less expense probably than any other company in Cripple Creek. In October over $50,000 was produced at a cost of only $8000, and it is not at all improbable that this showing will be surpassed in a very few months.

NEW MEXICO.

Silver City *Enterprise*: A strike of rich ore has been made in the Big Blossom mine, owned by Crawford and Woodward. The mine has heretofore had a good body of ore and has been producing twenty-five tons per week. The new strike is an increase in both quantity and quality. The ore body is over 4 feet in width and will average over $100 per ton in gold and silver.

Thomas Knucky of the Caldwell and St. Louis mines is producing about twenty-five tons per week of average grade copper ore, besides a small amount of high-grade ore.

At Pinos Altos the Treasure Mining Company has fifty men employed in the mine and mill. The ore is very base and but a small proportion of the gold value is saved on the plates. Five tons of concentrates are produced daily.

Bell and Stevens have put the No. 1 shaft in the Pacific down 410 feet. Their mill is kept crushing ore taken out in development work in the Pacific and Mina Grande mines.

ARIZONA.

Bisbee *Orb*: The new shaft at Pearce, near the bonanza mine of the company, is now down 100 feet, and is showing up equally well with the original shaft, showing that the entire length of the immense ledge of this property goes down.

From the La Fortuna mine, near Yuma, the gold is shipped in 400-pound bars, and the monthly output is reported to be between $80,000 and $100,000. The 20-stamp mill is crushing 80 tons of ore a day. Two years ago the La Fortuna was sold by three prospectors for $150,000.

Tombstone *Epitaph*: The Copper King Mining Company, which owns twenty-two claims near Bisbee adjoining the Copper Queen, was lately incorporated for $5,000,000 by New York men.

Prescott *Journal-Miner*: The Gladiator mill in the Bradshaw mountains has been started up again.

The Crowned King mill is again dropping its stamps day and night.

At the Columbia group of mines, in the Humbug district, sixty men are taking out ore from the Tampico and Yankee Blade. It is the intention of the company to extensively develop the property before building a mill, and if the ore bodies continue to show the results now obtained, a complete plant will be erected.

SOUTH AFRICA.

The directors of the Consolidated Gold Fields of South Africa (Limited) in their annual report place the net profits for the year ending June 30, 1896, at £1,119,726 6s 8d. After paying dividends a balance of £1,303,203 1s 6d was carried to the credit of this year. Dividends amounting to 25s per share were paid during the year.

One of the company's most important holdings is the Simmer and Jack Proprietary Mines (Limited). An issue of £500,000 5½ per cent first mortgage debentures has been made to partially provide for equipment and development of this property. The property worked by the company itself from the outcrops down amounts to 609 claims, and has almost, if not quite, the greatest length of outcrop of any of the Witwatersrand mines, extending nearly a mile. The continuity of the main reef series has been proved by a borehole to a depth of 2397 feet. In addition, the Simmer and Jack have holdings in other companies working on the freehold of the Elandsfontein estate, owned by them, which amount to nearly six hundred claims.

The company's holdings in the Gold Fields Deep include the following:

300,500 Robinson Deeps. (Total capital of company £400,000.)
48,992 Rose Deeps.
160,966 Glen Deeps.
153,350 Knight's Deep.
21,804 Simmer and Jack West.
37,725 Simmer and Jack East.
136,081 Rand Victoria Mines.
165,259 Jupiter Gold Mining Company.
5,000 Village Main Reefs.

CLAIM AND ESTATE HOLDINGS.

99 Claims under Henry Nourse.
457 Claims on Elandsfontein and Doornfontein.
½ Interest in Booysen Estate, containing 807 claims under Crown Reef, Crown Deep, Robinson, Robinson Deep, and other first-class properties.
¼ Interest in Ingramsburg Estate.
45 Per cent interest in Concordia Estate.
Interest in Klipriversburg Estate.
Interest in Turffontein Estate.
Interest in Vierfontein Estate.

In connection with these boldings John Hays Hammond, the company's engineer, quotes from the opinion of Prof. George F. Becker of the United States Geological Survey as follows:

"There is to my mind no doubt that if dynamite and freight charges on coal were at reasonable rates, and if the labor were better, and better economized, the Rand mines could now mine and mill ore for 18s per ton, the present expense being approximately 26s," and further summarizes his report as follows:

"In brief, then, it is very improbable that the ore of the deep mines in the region through which the main reef has been traced with certainty will show any general tendency to impoverishment; dykes and faults will probably give less trouble in the deep mines than in the outcrop mines; there is no ground for fearing unmanageable quantities of water, or even very serious pumping expenses; and the temperature will increase more slowly than in most regions. There are, in my opinion, no insuperable natural obstacles to mining on the Witwatersrand at a depth of 4000 feet, and no known reason why, under favorable industrial conditions, the expense should exceed the present cost at 500 feet."

As to Rhodesia the report says:

"The native outbreak in Rhodesia has necessarily retarded the progress of the country, and temporarily put a stop to business. The revolt, however, appears to be on the eve of suppression, and when the railway works now in hand are completed the interests previously acquired by the company will receive increased attention."

As to the condition of mining on the Rand the directors say:

"The mining industry in the Witwatersrand is rapidly attaining that importance and value which the directors have long foreseen. The political disturbances at the commencement of the year 1896 caused a not inconsiderable interruption to its development, but the yield of gold reported since the resumption of full work reached the record total of 212,429 ounces for the month of August, 1896. There is no doubt that this total will be very considerably surpassed in the near future, and that the Witwatersrand, in spite of fresh discoveries of gold in Australia and elsewhere, will remain at the head of the gold-producing districts of the world. The profits to the individual mines represented by the large aggregate yield above quoted have been very considerable, but it is estimated that the reduction in the pay of the native laborers which was inaugurated on October 1, and the beneficial results from restricting the supply of liquor, will result in diminishing the average cost of extraction by about 2s per ton of ore, or 5s per ounce of gold obtained, in which case the ratio of profit to the amount of gold produced will be largely increased. Certain legislative measures recently enacted are likely to improve the position of all classes employed in connection with the mines, judicious revisions of the conditions under which the work is carried on and necessary material is obtained, and due recognition of the pressing need for railway extension will further promote the success of the industry to the advantage of the republic and of all interests therein.

"Arrangements have been made with Mr. John Hays Hammond, who has previously acted as consulting engineer to the company in Johannesburg, to remain as the company's consulting engineer in London for a period of three years from July 1, making periodical visits to Johannesburg. Mr. Hammond's service and experience are placed solely at the disposal of the company for this period, his remuneration being covered by 1½ per cent of the net realized profits of the company. Mr. H. H. Webb has been appointed resident superintending engineer at Johannesburg, to take control of the engineering staff there."

Prof. Emmens' Discovery.

In a recent issue of the MINING AND SCIENTIFIC PRESS were published some extracts from an editorial in *Industries and Iron* in reference to Prof. Stephen H. Emmens' reported discovery of a means of transmuting silver into gold. In justice to Prof. Emmens is herewith published his reply as follows:

NEW YORK, Nov. 10, 1896.

To the Editor Industries and Iron, London:—I have been shown a quotation from a recent editorial article in your journal making an attack upon me in connection with my chemical work relating to the molecular constitution of gold and silver. This attack seems to me to be based upon various erroneous reports that have found their way into the newspapers. I trust, therefore, you will permit me to make, in your columns, the following statement respecting my attitude on the transmutation of metals.

1. I assert and am ready to prove, if challenged to do so, that many of the most eminent men of science of to-day as well as of past times, regard the transmutation of metals as being possible.

2. I assert, but am *not* ready to prove, that the conversion of silver into gold is an accomplished fact. I do not make this assertion in the hope or expectation of its being believed by anybody, whether scientific or unscientific. If Lord Kelvin or M. Berthelot were to make the like assertion, unsupported by proof, I should not feel myself called upon to believe it. I should not, indeed, doubt the veracity of such eminent men, but I should hold myself at liberty to deem them mistaken.

3. All that I intend or really do in the premise is to enter what may be termed a public caveat. I am firmly convinced that the end of the present century will see the advent of a new school of chemistry and physics which shall teach the way to technical progress far surpassing what has been accomplished under the doctrines hitherto accepted. I am not alone in this conviction; it is shared by many of the leading chemists of the day. I therefore conceive it a matter of scientific duty on my part to boldly throw down the gloves of priority at the feet of my fellow-investigators. I issue my challenge to the whole world of science. If anyone thinks himself my predecessor in the art of transmuting metals, let him make public his claim. I will meet him, claim for claim and *proof* for *proof*. If none take up my gage, my claim to be the pioneer and leader of the new chemistry will at least remain undisputed, and must be universally conceded whenever I may think proper to reveal its foundation of fact.

Your obedient servant,
STEPHEN H. EMMENS.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 10, 1896.

571,060.—MOLD PATTERN—M. A. Baker, Los Angeles, Cal.
571,302.—BICYCLE—L DeRome, S. F.
571,086.—PUMP POWER—Fulton & Ames, Galt, Cal.
571,115.—AIR BRAKE—F. L. Guillemet, S. F.
571,116.—AIR BRAKE—F. L. Guillemet, S. F.
571,320.—CAR FENDER—Holloway & Starkweather, Los Alamos, Cal.
570,937.—STOVE LID—G. B. Littlefield, S. F.
571,275.—SCREEN FOR URINALS—Maxwell & Gorman, Los Angeles, Cal.
571,009.—REGISTER—H. S. McCormick, Oakland, Cal.
571,054.—SAFETY PIN—A. T. Snell, Santa Barbara, Cal.
571,102.—METALLIC TOOTH CROWN—L. L. White, Oakland, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MOLDS FOR SHAPING METALLIC TOOTH CROWNS.—Louis L. White, Oakland, Cal., assignor of one-half interest to Walter F. Lewis, same place. No. 571,102. Dated NOV. 10, 1896. The object of this invention is to provide a means for shaping seamless metallic tooth crowns into accurate form. It consists of a casing or shell, a core of soft metal seated in the shell having a hole for the reception of a metallic die, the mold having a central perforated lower section, an upper section removably fitted thereto having a conical hole, the lower end of which aligns with the hole in the lower section. The core of soft metal is formed in readily separable sections and fits into the conical hole of the upper section of the casing or shell.

IRONING TABLE.—Charles I. Hofwolt, Santa Rosa, Cal. No. 570,636. Dated Nov. 3, 1896. The object of this invention is to provide an ironing table which is adapted for handling with ease and precision large articles, keeping them compact, out of the way and smooth during the operation of ironing. It consists of a frame having a suitable ironing board at its top, a readily removable and transferable roller at one side of the frame at which the article to be ironed is first rolled and from which it is gradually unrolled as the work proceeds, a similar readily removable and transferable roller on the opposite side upon which the article is again wound as the ironing progresses and pawls, ratchet wheels and a power device for operating the rollers.

ROTARY PUMP.—John D. Keller, Santa Clara, Cal., assignor of one-half interest to Otto Leu, same place. No. 570,643. Dated Nov. 3, 1896. This invention relates to that class of rotary pumps or engines in which readily slidable pistons revolving concentrically with the interior of the shell are operated by an eccentrically located cylinder or carrier which forms an abutment at one side with the interior of the shell, and a water or steam space on the other side. It consists essentially of a shell with rotating pistons operating concentrically therein, an eccentrically located cylinder or carrier through which the pistons operate, an abutment in the shell against the cylinder or carrier, said abutment having a downwardly extending back passage joining the water space within the shell and adapted to receive the sand and other foreign matters at the beginning of the abutment and dispose of them. A controllable discharge passage communicates with the base of the passage. Adjustable bearings are interposed between the pistons and the cylinder or carrier, these bearings having sockets and wearing plates in the sockets with springs by which they are controlled, wearing plates in the socket of the bearing plate of the cylinder or carrier and springs for holding them to contact with the opposing wearing plates in the oscillating bearings. The axle upon which the pistons are mounted is made hollow and has discharge holes through its interior to supply a lubricant to the bearings of the pistons, a tubular exteriorly threaded extension to the exterior of the shaft, a spring controlled valve, a communication between the cavity of the shaft and that of the tubular extension and an interiorly threaded nut provided with a plunger operating upon and in the tubular extension to force the lubricant into the cavity of the shaft upon which the pistons are mounted.

LETTER BOX.—Frederick G. Gaschlin, San Francisco, Cal., assignor of one-third interest to Jacob Mass, same place. No. 570,628. Dated Nov. 3, 1896. The object of this invention is to provide a letter or other box adapted to readily receive and dispose of the matter inserted and to close itself and so confine the matter disposed that it cannot under any circumstances be withdrawn or reached when the receiving aperture is open, the device forming an automatic safety letter box. It consists essentially of a letter or other receiving box comprising a casing with a receiving opening, a tilting receiver pivoted within the box having an open front adapted to be brought into alignment with the receiving opening of the box, a swinging guard plate adapted to cover and uncover said opening, a curved flange on the front end of the receiver adapted to temporarily cover the box opening preceding the alignment of the front of the receiver therewith and connections between the guard plate and the tilting receiver which bring the latter up into position to cause its open front to align with the opening and as the front guard plate covers the opening to turn the receiver downwardly within the box to discharge its contents.

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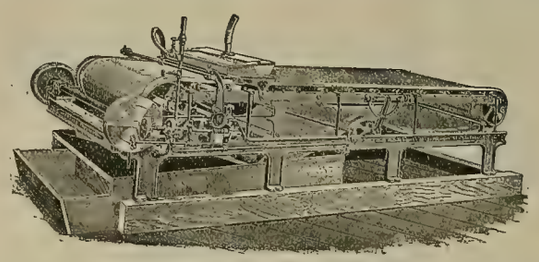

"TRIUMPH" ORE CONCENTRATOR.

TELLURIDE, COLO., July 14, 1896.
Joshua Hendy Machine Works, San Francisco, Cal.—GENTLEMEN: Yours of recent date duly received. Regarding the "Triumph" Concentrator, we have eight 5-foot and eight 4-foot machines; they are giving perfect satisfaction. In addition to the above we have ten "Frue" Vanners. I am replacing these with your machines as fast as possible, as all our experiments show the "Triumph" to make a better saving, and their capacity is much greater in every respect. I consider the "Triumph" superior to anything of the kind we have ever used. Yours very truly, [SIGNED] N. T. MANSFIELD,
Gen. Supt. The Smuggler-Union Mining Company.

QUARTZ MOUNTAIN, TUOLUMNE CO., CAL., April 25, 1896.
Joshua Hendy Machine Works, San Francisco, Cal.—GENTLEMEN: Having carefully noted the operations of the "Triumph" Ore Concentrators you put in for the App mine, I am pleased to state, for your information and for such use as you may deem proper to make of this testimonial, that I am entirely satisfied with their operations, and especially the resultant high percentage of valuable concentrates which they save. Very truly yours, [SIGNED] FRED COOK, Supt. of App Mine.

PLACERVILLE, CAL., May 16, 1896.
Joshua Hendy Machine Works, San Francisco, Cal.—GENTLEMEN: The 5-foot "Improved Triumph" Concentrators we have at work in our Grand Victory mill are giving us the best of satisfaction. They do nice clean work, with very little attention, and do not easily get out of repair, and we are carrying to each of them at least 50 per cent more pulp than to our 4-foot Frue Vanners, in operation in the same mill. Our sulphurets are exceedingly fine and require very close concentration, and the "Triumph" seems to do it just about right, and should we add to our concentrating capacity we shall certainly use more "Triumphs." Very truly yours, [SIGNED] GRAND VICTORY GOLD MINING CO.,
Per H. E. Picket, Manager.

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Triumph Concentrators,
Hendy-Norbom Concentrators,
Rock Breakers,
Hydraulic Mining Machinery,
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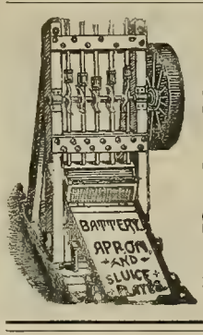

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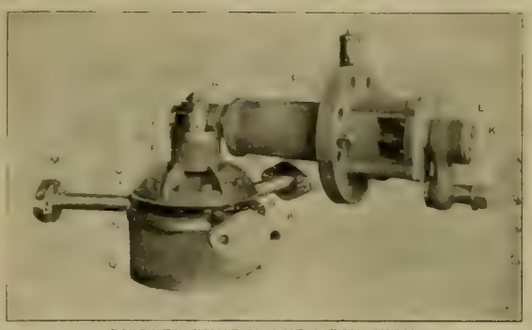

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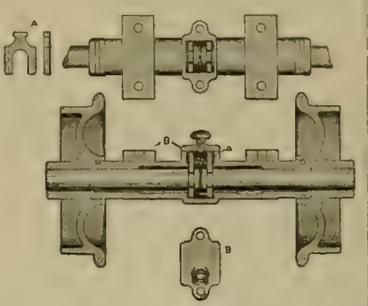

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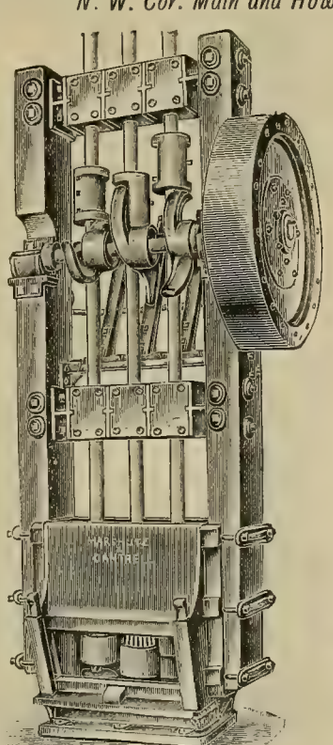

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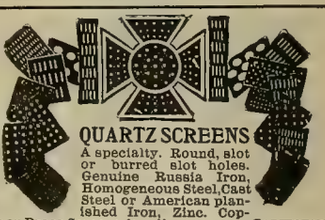

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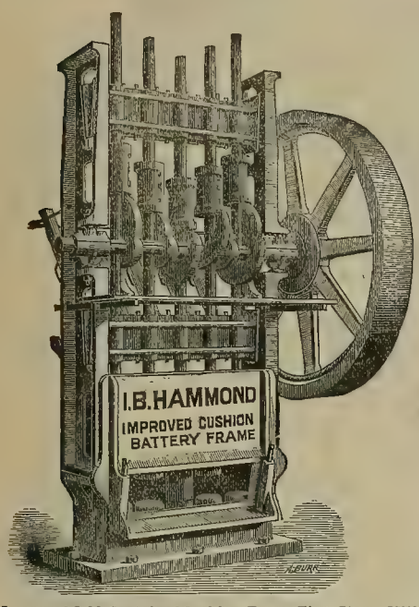

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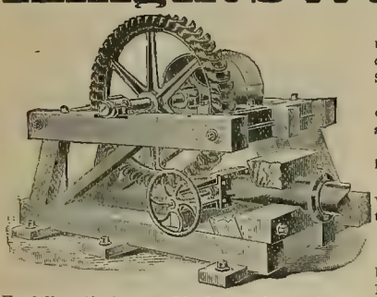

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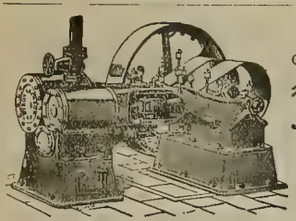

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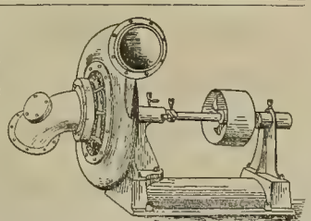

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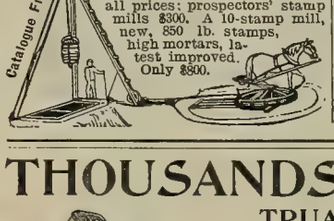

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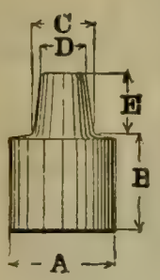

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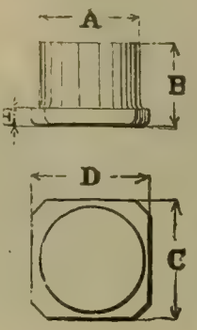

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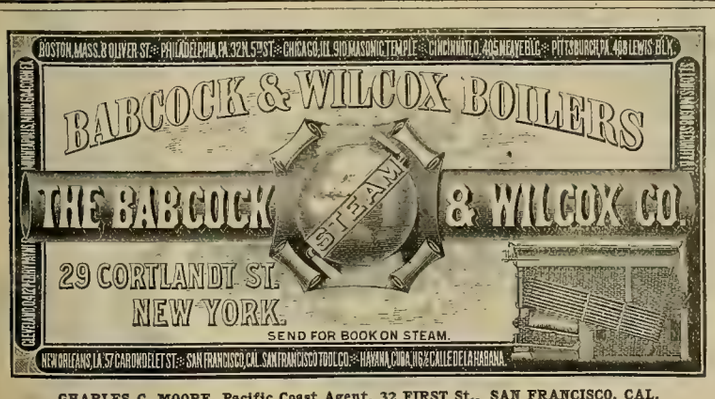
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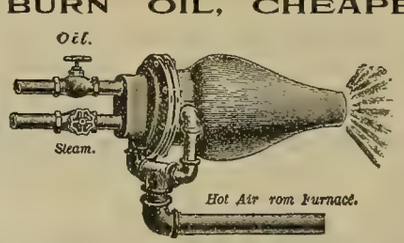

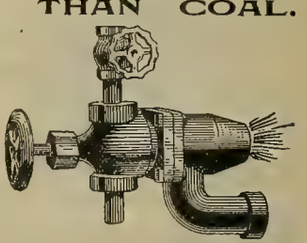

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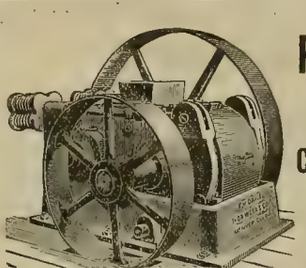

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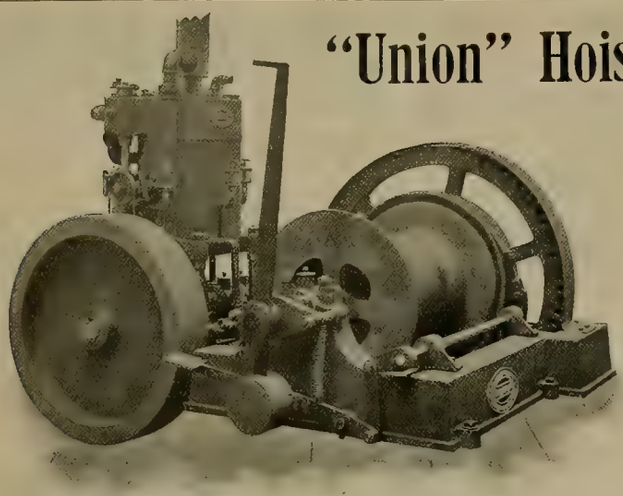

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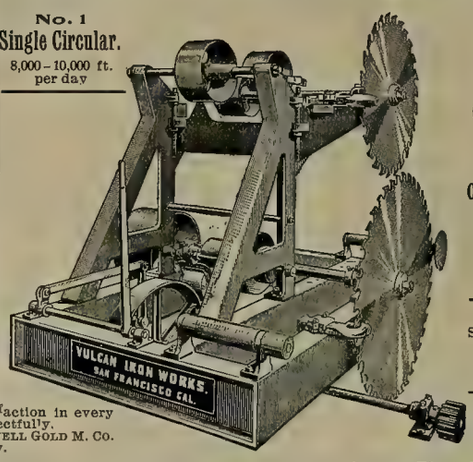

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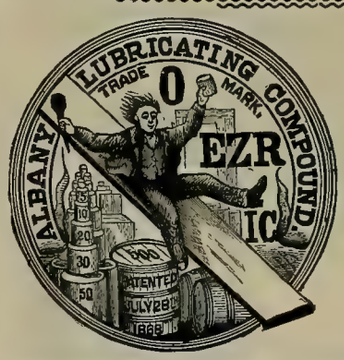

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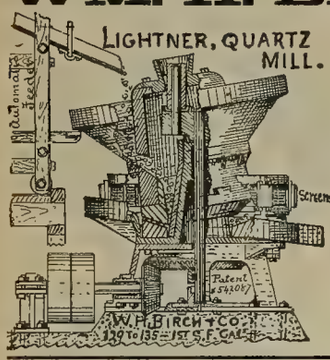

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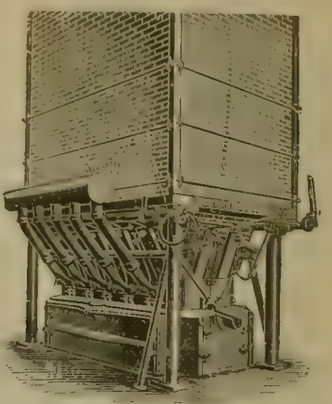

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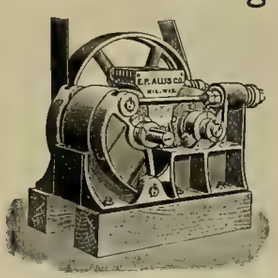

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Minneapolis, Minn.	427 Corn Exchange.
Chicago, Ill.	509 Home Ins. Building.
Kansas City, Mo.	43 Armour Building.
Pittsburg, Pa.	German National Bank Building.
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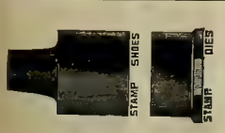

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Market Reports.

The Markets.

SAN FRANCISCO, Nov. 19, 1896.

General business has held up well. The continued high prices ruling for wheat and fair average prices for other farm products are important factors in promoting more prosperous times. The better informed operators in grain estimate that the advance in the market value of wheat within the past ninety days has benefited this State fully $2,000,000 and the coast fully $3,500,000. It is stated that while speculators were large gainers, still there were fully 75 per cent, if not more, of the farmers who were largely benefited. It is also reported that about all the surplus wheat has passed out of first hands and as the money circulates easier times are noted. In mining circles there continue more or less reports, seemingly from authentic sources, that the inquiry for gold properties is increasing and that 1897 will witness more activity than has ruled the current year. This will not be confined to California, but will extend to every gold mining district on the Pacific coast.

Continued growing ease is reported in financial circles, with very little, if any, friction met in securing accommodations. Money is also obtainable on realty which is making itself favorably felt in this direction. The validity of the Wright Irrigation law being established by the United States Supreme Court has done no little in promoting a better feeling in California securities which will cause Eastern and foreign money to be invested in them. Bonds which sold previous to the decision at 30 to 37½ cents, jumped to par so soon as the latter was made public. Mail advices from New York report as follows: The money market now reflects chiefly the anxiety of lenders to get money out, and most prominent among these lenders seem to be people who had no money at all to lend before election. Now they are only afraid that they will not be able to put it out at all. Those who did put money out before election succeeded in getting some very choice loans, as is always the case in times when money is hard to get. Everything in the market promises greater ease. A feature of importance in the local money market is the extent to which the money from hoards has gone into securities for investment. This takes stocks out of traders' hands and causes the paying off of loans on which these stocks were collateral, thus increasing the pressure of loanable funds. The supply of commercial paper is fair, but not large. Demand continues very good, with choice names moving at low rates.

New York Silver Prices.

NEW YORK, Nov. 19.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	29 13-16	64¾
Saturday	29 13-16	64¾
Monday	29⅞	64⅞
Tuesday	30	65⅛
Wednesday	29⅞	65
Thursday	29⅞	65

	Copper.	Lead.	Iron.	Tin.
Friday	11 15	2 95	10 75@13 00	13 10
Saturday	11 20	2 92½	10 75@13 00	13 10
Monday	11 25	2 92½	11 00@13 00	13 15
Tuesday	11 30	2 90	11 00@13 00	13 15
Wednesday	11 35	2 90	11 00@13 00	13 15

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	5c Prem
New York Telegraphic Transfer	10c Prem
London Bankers' 60 days	$4.83
London Merchants	$4.82½
London Sight Bankers	$4.86½
Refined Silver, per oz., 1000 fine	.65
Mexican Dollars	51½@52¼

SILVER—The market has strenghtened slightly. It is stated that the surplus supply in this country and Europe is light and with an improved call from any quarter prices would advance. If the usual December rains fall in India it is expected that a good demand will set in from there for crop purposes beginning next March. In our market there is a light call. The imports of bullion in October at this port aggregate about $237,000.

MEXICAN DOLLARS—The movement is light. The shipments from Mexico continue to go largely to the East for export.

QUICKSILVER.—There is a continued fairly free movement by sea and rail. The last steamer for Mexico took out 136 flasks. The receipts at this port in October aggregate 1151 flasks and exports by sea 680 flasks to Mexico and 100 flasks to Central America.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

COPPER.—The market has strengthened the past week in sympathy with the East and Europe. The consumption is steadily enlarging in this country and promises to be quite heavy before the winter and spring months pass. In Europe the consumption not only continues heavy but seems to be increasing which is gaining on the production. From present information it seems quite safe to predict still better prices at home and abroad.

Ingot, jobbing	14½@—
Ingot, wholesale	13½@—
Sheet copper	17 @—

LEAD.—The market is easier, but not quotably lower. The markets at the East and abroad are reported slower.

Our market is quoted as follows:

Pig	—	@	3 75
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is a good seasonable demand.

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

ANTIMONY.—Our market is quoted at 7¾@8½c in a jobbing way. New York mail advices quote 7¾@8c for Cookson's, 6½@7c for Hallett's and 6⅛@6½c for Japanese, from store.

BORAX.—The market is essentially unchanged.

The market is quoted as follows:

Refined, in car lots	6⅜
Refined, in sacks	5⅝
Powdered, in car lots	5¼
Concentrated, "	5⅝

TIN.—The market is quiet for both pig and plate. It is stated that the canners are feeling the market with the view of placing orders.

Pig, per lb	14¼c@ —
Plate, I C coke, heavy, per box	— @$4 05
" " light, "	— @ 3 95

IRON.—The market is stronger, with a disposition to ask more money, in sympathy with the East, where there is a strong growing demand. Large orders have been placed for rails and structural materials, which will call for liberal quantities of pig iron. On November 1 the number of furnaces in blast was 133, with a weekly capacity of 124,077 gross tons. For the first time since Dec. 1, 1895, the number of pig iron furnaces in blast shows an increase. Last December there were 242 furnaces in blast, while on October 1st last the number had fallen to 130, and the average weekly capacity had fallen in the same time from 216,797 tons to 112,782 tons. The number of coke and anthracite furnaces in blast November 1st was 112, with capacity of 119,094 tons per week, against 105 furnaces October 1st, with a capacity of 105,520, and 219 furnaces on Dec. 1, 1895, with a weekly capacity of 211,565.

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 0
Gartsherrie	21 50	23 0

Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing	20

POWDER.—The market is active at unchanged quotations.

The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, " "	8½c

COAL.—Notwithstanding heavy imports the market is fairly steady. For shipments from Europe and Australia more money is asked.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	— —@ 5 00
Cannel	— —@ 8 00
Egg, hard	— —@11 50
Wallsend	— —@ 6 00
Scotch Splint	— —@— —
Brymbo	— —@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	8 00	@	— —
" spot, in bulk	8 00	@	9 00
" in sacks	8 50	@	— —
Cumberland	— —	@	— —

LUMBER.—There is a continued good outward movement.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—It is reported that there is some cutting in prices. Our Eastern advices indicate that the syndicate is not strong enough to stop cutting there and consequently lower prices are reasonably looked for. If reports are correct it looks as if the syndicate will go to pieces before the turn of next year.

The market is quoted as follows:

Wire, carloads, basis per keg	$3 20
" jobbing, " "	3 30
Cut, carloads, " "	2 95
" jobbing, " "	3 05

Mining Share Market.

SAN FRANCISCO, Nov. 19, 1896.

The action of the market begins to look as if it is being manipulated, but whether by a person in the interest of a combination of small pools or for moneyed men it is hard, as yet, to say. It is more than likely that the former have joined forces so as to take advantage of any favorable news that may be received from the work on the Brunswick lode. At this season of the year there is quite an influx of miners and others to San Francisco and neighboring points, and as they are possessed of more or less money there is quite a temptation to make a small deal in the share market to induce them to put in their savings. Aside from this it is a well established fact that money, aggregating a large sum, was withdrawn for safety from the banks before election which might also be invested for a turn or so in the market if the proper inducements were held out. Taking these factors for a deal and also reports that the banks are more disposed to favor borrowers in combination with the exploiting work on the Brunswick lode being of a favorable character and it ought not to cause surprise if the small pool combine should succeed in making a deal before long. Whether this will be done before or after a line of assessments has been levied it is hard to say.

Herman Zadig has returned from a visit to Virginia City and while there, it is said, he watched with considerable interest the work in two or more of the mines on the Brunswick lode. It is reported that he expresses himself as being well convinced that in Chollar, on the 400-foot level, the downward continuation of the ore found on the 300-foot level will not only be struck, but show quite an improvement over that on the level above. The work in Hale & Norcross, Savage, Gould & Curry, Best & Belcher and Con. Virginia is also attracting attention. There are mining men who claim that in one of the above named mines the good results will follow the work now under way. In Occidental the usual dead and exploiting work is the order with no essential change in the material encountered. It is stated that levels lower down will have to be opened and exploited before a body of ore of much importance is developed. In Chollar they are still working on the 300-foot level. On the 400-foot level the south drift is being run to make a crossdrift so as to strike the ore found above. It is stated that it will take from ten to fourteen days before they can reach the ore. In Hale & Norcross they are still extending the crossdrift on the 400-foot level. It is stated that almost any day they are liable to strike the downward continuation of the ore. In Savage they are working on the 300-foot and 400-foot levels. The formation of the material encountered on the latter level is said to be quite favorable. In Gould & Curry and Best & Belcher the exploiting work under way is being closely watched as it is pushed ahead. The crossdrift from the 300-foot station in shaft No. 2 is being pushed slowly ahead. They cut a streak of ore the past week which caused the shares to advance slightly only to sell down again.

From the Comstock lode the news, taken as a whole, is not of a character to create interest, although in several the work is still being pushed in the right direction, yet this can be turned or else stopped at any time. From the general tenor of advices, it seems to be settled not to show up the west or Red lode, which is known to be largely gold-bearing, with three or four of which said to assay quite high. The official letter from Alta reports that in the east drift on the 725-foot level they are in favorable formation. The south drift on the 815-foot level is in quartz, a stringer of which assays over $34 per ton. From Overman nothing new has come to hand. The Seg. Belcher letter reports that a few tons of ore is raised—more than enough to pay current expenses, for it is mostly gold-bearing. No particulars are given as to the work that is being done. The last letter from Belcher reports nine miners at work against seventy-eight the week before. Ore is being raised, while over 330 tons have been sent to the mill for reduction. The letters from Challenge, Confidence and Con. Imperial are a virtual repetition of those that have come to hand the past few weeks. In Alpha the work appears to be not to strike the west lode, owing, it is reported, to there being too many shares out. The work in Bullion is on the same level and direction reported last week. In Potosi and Chollar exploiting work is continued on the levels heretofore published. Some ore is extracted and raised. In Hale & Norcross no change is reported in the work or material encountered. Active exploiting work is reported in Savage, but nothing so far of an encouraging character. The joint east crossdrift run by Best & Belcher and Gould & Curry from the Bonner shaft is being pushed slowly ahead. The official letter from Con. Virginia reports that some timbers caught fire on the twenty-seventh floor of the 1750-foot level, but were blockaded so as not to interfere with the work. The work on the 1650-foot and 1000-foot levels ought to be soon advanced far enough as to have an important bearing on the shares. The work that is being done in Ophir and Mexican, to the west, is well thought of by mining men. The official letters from Union, Sierra Nevada, Utah and Andes do not report anything new as to the work or material encountered.

The market opened weak and inactive this morning. After call there was a decline in Chollar and Con. Virginia, which caused the entire list to sell lower. Towards noon Chollar strengthened to $1.70 bid, causing a steadier feeling. There seems to be a general impression that the Chollar workings on the Brunswick lode are a failure and will prove another Occidental. While this appears to be the prevailing opinion yet with mining men who have visited the lode, the belief prevails that it is quite far from a failure and that the outlook is altogether hopeful. On the 800-foot level they have made preparations to raise on a 2-foot vein of ore running from $40 upwards per ton, mostly gold, for the purpose of extracting and milling the ore. From all we can learn, they have in sight a very large quantity, which can be made to pay quite well, even if it mills $20 coin value. The vein extends up to the 200-foot level and, it is said, down to the 400-foot level. If this is so, then there are several thousand tons in sight. Official letters filed from the Potosi superintendent report they are extracting ore from the 80-foot level, west croppings, which assays, coin value, $14.35 per ton. This will pay quite well. Chollar extracted 104 tons of ore, coin value $15 per ton. Hale & Norcross milled the past week 134 tons of ore, which yielded $3414.12 gold and 3255 88-100 ounces fine of silver. The average wagon sample assay was $25 gold and 30 ounces silver. The battery assay was $19 gold and 27⅞ ounces silver. The percentage obtained of the wagon sample was 89 and of battery assay 104 3-10. It will be seen by the above that the battery assay of the 134 tons was $19 per ton gold. As the United States Mint at Carson returned to the company $3414.12 in gold, it necessarily follows that the battery assay is a delusion and a snare as far as the gold is concerned, for the ore returned in gold coin $25.48 per ton.

The following illustrates the changes of the week:

Mines.	Nov. 12.	Nov. 19.
Alpha		
Alta Consolidated		
Andes	$ 23	$ 18
Belcher	43	30
Best & Belcher	88	77
Bodie		52
Bullion	15	14
Challenge	32	33
Chollar	1 80	1 75
Confidence		
Consolidated California and Virginia	1 70	1 65
Consolidated New York		
Crown Point	34	29
Exchequer		
Gould & Curry	64	56
Hale & Norcross		
Justice	03	
Mexican	61	53
Ophir	1 20	1 25
Overman	10	
Potosi	76	70
Savage	62	57
Sierra Nevada	62	54
Union	49	46
Utah	09	
Yellow Jacket	45	34

San Francisco Stock Board Sales.

SAN FRANCISCO, November 19, 1896.

9:30 A. M. SESSION.

300 Andes	18	100 Ophir	1 25
200 Bullion	14	100 Potosi	70
200 Challenge	33	200 Savage	57
350 Chollar	1 75	100 Sierra Nevada	54
100 Con Cal & Va	1 65	500 Union	46
100 Gould & Curry	56	100 Yellow Jacket	34
400 Mexican	53		

SECOND SESSION—2:30 P. M.

200 Mexican	43	400 Yellow Jacket	32
300 Gould & Curry	56	600 Belcher	30
300 Best & Belcher	77	500 Sierra Nevada	50
100 Con Cal & Va	1 65	200 Union	45
100 Savage	53	400 Occidental	23
100 Chollar	1 70	300 Bodie	52
300 Crown Point	29		

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.		Secretary.
Challenge Con M Co	22	10c	Oct 14.	Nov 17.	Dec 8.	C L McCoy, Mills Bldg
Channel Bend M Co	5	2c	Nov 9.	Dec 12.	Jan 2.	J P Langhorne, 39 Sutter
Exchequer M Co	39	5c	Nov 14.	Dec 17.	Jan 11.	Chas. E Elliott, Nevada Block
Goleta M Co	4	20c	Sept 21.	Nov 2.	Dec 2.	D M Kent, 330 Pine
Greenwood G M Co, Cal	1	2c	Oct 16.	Nov 23.	Dec 14.	Chas E Elliott, 309 Montgomery
Horsefly G M Co	1	25c	Nov 4.	Dec 21.	Jan 20.	R T Ward, 610 Clay
Horse Shoe Bar Con M Co	5	10c	Oct 29.	Dec 5.	Dec 26.	D M Kent, 330 Pine
Justice M Co	61	5c	Oct 14.	Nov 17.	Dec 8.	R E Kelly, 309 Montgomery
Nimshew G M Co	2	2c	Oct 2.	Nov 9.	Nov 30.	C D Cook, Pier 1, Mission St
Riverside G M & M Co	4	30c	Sept 21.	Nov 10.	Dec 15.	Chas Peach, 237 12th
Mexican G & S M Co	55	20c	Oct 9.	Nov 12.	Dec 3.	Chas E Elliott, Nevada Block
Minaret M & M Co	1	½c	Oct 9.	Nov 15.	Dec 1.	Geo R Armstrong, 309 Montgomery
Montecito M Co	3	15c	Sept 21.	Nov 2.	Dec 2.	D M Kent, 330 Pine
Mt Diablo M & M Co	5	10c	Oct 27.	Nov 30.	Dec 21.	R W Heath, 318 Pine
North Gould & Curry, Nev	17	10c	Nov 4.	Dec 5.	Dec 22.	C H Mason, 337 California
Potosi M Co, Nev	46	25c	Sept 28.	Nov 4.	Nov 24.	Chas E Elliott, Nevada Block
Reward G M Co	16	2c	Nov 11.	Dec 14.	Dec 30.	S W Backus, Mills Bldg
Savage M Co	90	20c	Oct 2.	Nov 4.	Nov 24.	E B Holmes, Nevada Block
Silver King M Co	15	25c	Oct 26.	Dec 7.	Jan 5.	J W Pew, 310 Pine
Sterling M Co	3	15c	Sept 21.	Nov 2.	Dec 2.	D M Kent, 330 Pine
Thorpe M Co, Cal	4	5c	Oct 14.	Dec 12.	Jan 9.	A F Frey, 567 Market

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Jupiter Gravel M Co	W A Keefer, 14 Grant Ave	Dec 7
Mexican G M Co	Chas E Elliott, Nevada Block	Nov 25

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Recent California Mining Incorporations.

Randolph Gold Gravel Mining Company, Grass Valley. J. Glasson, J. R. Thomas, G. Griffin, A. Howell, R. Eddy. Capital stock, $20,000, all subscribed.

Anchor Mining Company, San Francisco; capital stock, $25,000 all subscribed; H. F. Fortmann, W. A. Frederick, C. Hirsch, H. A. Williams, N. J. Coleman.

Rockland Gold Mining Company, San Francisco. F. X. Simon, G. F. Davidson, J. Rosenthal, T. Fox; E. D. Farish. Capital stock, $500,000, $125 subscribed.

Visalia Mining and Milling Company, Visalia. A. Shonero, E. Downing, R. L. Underhill, J. A. Pendergrass, Visalia; C. B. Simmons, Exeter. Capital stock, $90,000, all subscribed.

San Andreas Mining Company, San Francisco. J. D. French, Oakland; W. Forsyth, Fresno; B. H. Ramsdell, Alameda; H. G. Platt, M. Fleishaker, San Francisco. Capital stock, $300,000, all subscribed.

Great Bear Mining and Development Company, San Francisco. G. E. Ellis, A. Hoffschneider, H. L. Norton, Oakland; W. H. Hansen, Alameda; A. W. Delafield, East Oakland; C. K. Garrison, Fruitvale; H. O. Eifert, San Francisco. Capital stock, $150,000, $3,500 subscribed.

Recently Declared Mining Dividends.

Swansea, Utah, $5000; payable Nov. 25th.

Golden Fleece, Colorado, $6,000, payable Nov. 20.

Centennial-Eureka, Utah, $30,000; payable Nov. 14th. The total to date is $1,890,000.

Starr King Mining Company, $37,500; payable November 16th. Total sum paid since organization, $825,000.

Galena, Utah, $5000; payable Nov. 20th. The total to date is $61,000, of which $55,000 has been paid this year.

Bullion-Beck, Utah, $30,000; payable Nov. 20th. The total to date is $1,902,000, of which $245,000 has been paid this year.

Elkton, Colorado, $20,000, payable Nov. 20. This company has been paying regular monthly dividends of $10,000 for several months. There is at present a reserve fund of $150,000 in the treasury.

Calumet and Hecla Mining Company, of $5 per share, payable Dec. 17, to stockholders on record Nov. 19: the fourth dividend declared during the fiscal year and the fifth for the calendar year, or $25 per share, bringing the aggregate disbursements by the company up to $46,750,000.

Commercial Paragraphs.

THE Parke & Lacy Co., 21 & 23 Fremont St., are sending out a good many Ropp straight-line furnaces to leading concerns, and are about building several on a Mexican order.

A CONTRACT for twenty-five air compressors and twenty-five air receivers, of medium and small sizes, has been closed by the Clayton Air Compressor Works, Havemeyer Building, New York, with one company, delivery of the entire order to be made within six months from date. They also report sales of five air compressors of standard pattern during the first week in November. The indications point to a decided revival of trade in air compressors.

FRASER & CHALMERS of Chicago have an order from Honolulu for pumping engines for the Ewa plantation: Two pumps each of a capacity of 10,000,000 gallons in 23 (not 24) hours—one, a duplex double-acting Riedler pump, plungers 14½ inches diameter by 42 inches stroke, driven by a horizontal cross-compound condensing Corliss engine, steam cylinders 24 and 38 inches diameter by 42 inches stroke, capacity 7225 gallons per minute against a head of 197 feet, when running about 70 revolutions per minute. The other pump is similar except that the head will be 120 feet, pump plungers 15¾ inches diameter and steam cylinders 20 and 32 inches diameter respectively.

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Assessment Notices.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Calaveras County, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 14th day of October, 1896, an assessment (No. 4) of five (5c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 507 Market street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 12th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on SATURDAY, the 9th day of January, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—No 507 Market street, San Francisco, Cal.

GREENWOOD GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Greenwood, El Dorado County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 16th day of October, 1896, an assessment (No. 1) of two (2c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 79, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23rd day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 14th day of December, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. R. ELLIOT, Secretary.

Office—Room No. 79, Nevada Block, No. 309 Montgomery street, San Francisco, California.

GOLD RIDGE CONSOLIDATED MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada and Sierra Counties, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 20th day of October, 1896, an assessment (No. 5) of two and one-half (2½c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 21st day of November, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 14th day of December, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

WM. F. McLAUGHLIN, Secretary.

Office—Rooms 12 and 13, No. 43 Sixth street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION HAVing received applications to mine by the hydraulic process from Edgar Mayhone, in the Gould Mountain Mining Company, Fair Play, El Dorado county, to deposit tailings in Spanish creek; from Nickelson & Williams, in the Crawford diggings, near Camptonville, Yuba county, to deposit tailings in Bridger creek; from McDonald & Hoffman, in the Gilbert mine, near Yankee Jim's, Placer county, to deposit tailings in Devil's canyon; and from the Oregon Gold Mining Company, in the Forty-nine mine, near Enterprise, Butte county, to deposit tailings in a ravine, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on December 7th, 1896, at 1:30 P. M.

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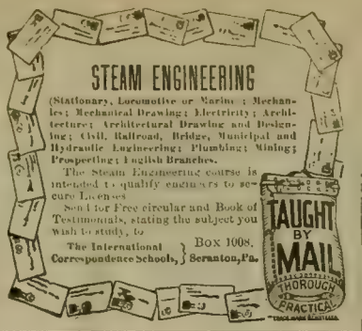
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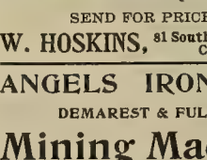

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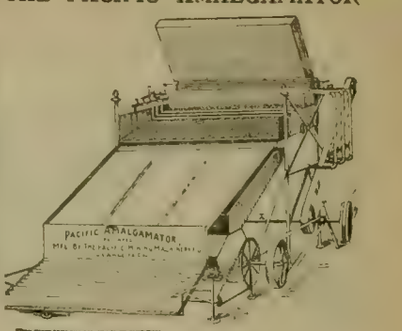

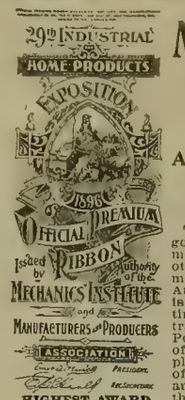

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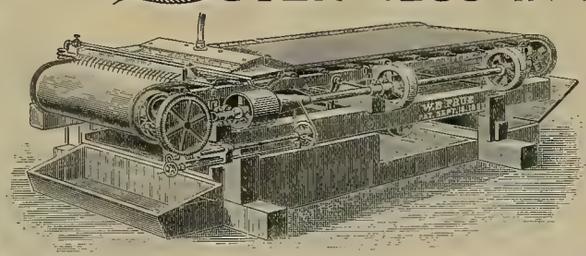

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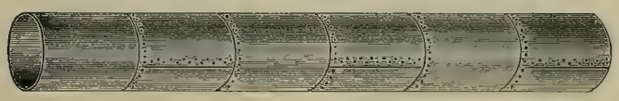

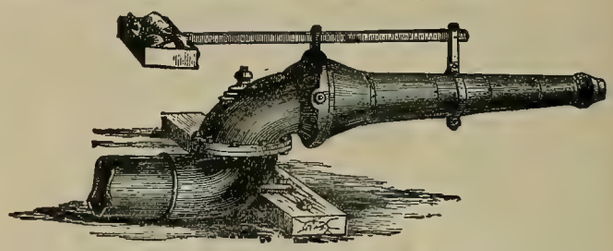

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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1899.—VOLUME LXXIII. Number 22. SAN FRANCISCO, SATURDAY, NOVEMBER 28, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Will Mining Decline?

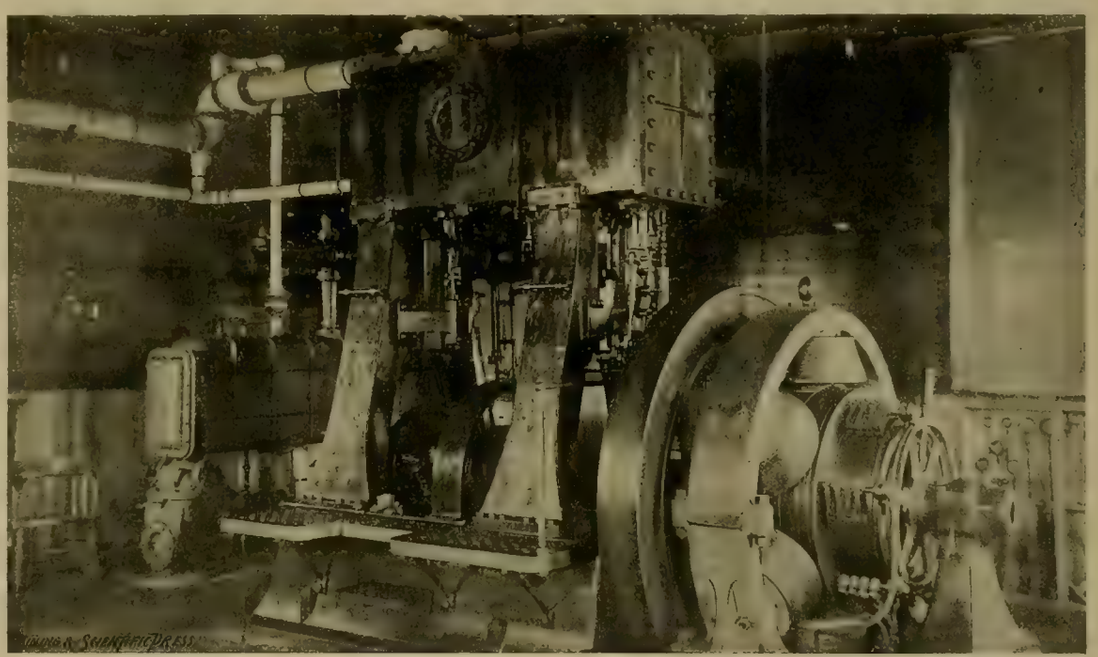
Many of those who have taken part in the mining booms in the past quarter of a century predict that in two or three years the present activity in that industry will cease, and that we shall return to the condition of five years ago, when it was hard to induce capital to consider any offer of investment in that direction. It must be remembered, however, that the conditions have changed entirely. The industry was then carried on by a very different class of men from those who are now taking the lead. As conservative men are now going into mining as into banking and other mercantile pursuits, or manufacturing, or agriculture. They are not going in for the purpose of speculating, but for the larger legitimate profits that the industry promises.

The chief reason for this is the fact that with improved methods and better knowledge of how the industry should be conducted there need be little more risk in mining, provided as much care is taken, than in buying into any well-established business.

With the passing away of speculative mining there are disappearing some elements that can well be spared. One evil that has had its day is the unscrupulous promoter who bonds worthless mines and expects with the aid of an expert with a name to sell them for large sums. Much is to be said for the honest promoter. He is a necessity and does much good in bringing together the capitalist and the mine owner who is without money.

Twenty-five years ago the charges of experts for examining mines were very small compared with what they are now. The reason for this was that the country was overrun with men of ability, but without scruples, who expected, to say the least, better fees for good reports than bad. These men have been weeded out and can do no business. The result is that those who have withstood the test receive princely fees, paid as much for their reputation for integrity as for their ability. Often upon the report of one of these alone millions are invested without question. Curiously, there is a prejudice among many miners against the expert, and yet he is the best friend they have. He has killed more swindles and caused the opening up of more good mines than any other class of miners. He has done more than any one else to discourage the dishonest promoter.

The business of mining the precious metals is being built up on conservative lines, and the present activity is not a passing furore. The reduction in the cost of mining and milling has so widened the field that ten mines may be worked at a profit to-day to one twenty years ago.



ROUSE ELECTRIC PUMPING PLANT—150 H. P. DIRECT COUPLED ENGINE AND GENERATOR, WITH CONDENSER. (See page 444.)

Store House. Boiler House. Compressor House. Electric Power House.

ROUSE COAL MINE, COLORADO. (See page 444.)

In about ten years from the time of the discovery of gold in West Australia the population has increased from about 30,000 to over 100,000, and the revenues of the colonial government have grown from about £250,000 to £863,680, the amount returned for 1895. A scarcity of water has been a great drawback and a large proportion of the gold mined has been lost in the use of dry processes. To remedy this in the future the government has under consideration a scheme for pumping water from the Darling river to a reservoir on top of Mount Burgess, at a cost of £2,500,000.

For many years tales have been told of great mineral wealth within the borders of the Navajo reservation, in northwestern New Mexico. According to these the Navajos used gold for making bullets, and among other things there was a "mountain of gold." A few months ago some Colorado mining men, with the consent of the chief of the Navajos, explored the country and they report that they found nothing to justify any of the old tales.

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J. F. HALLORAN.....General Manager

San Francisco, November 28, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Rouse Electric Pumping Plant—150 H. P. Direct Coupled Engine and Generator, with Condenser; Rouse Coal Mine, Colorado, 437. Triple Discharge Two-Stamp Gold Quartz Mill; Naphtha Launch, 443.

EDITORIAL.—Will Mining Decline? Great Increase in West Australia; Mineral Wealth in New Mexico, 437. Salting; The Government's Mining Bureau; Low Grade Mines; Director Walcott and the Geological Survey; Railroads, Electricity and Mine Development; The Value of the Gravel Mines, 438.

MECHANICAL PROGRESS.—Gun Metal and Bronzes; Triple Discharge Two Stamp Gold Quartz Mill; Simplex Naphtha Launch Engine, 443.

SCIENTIFIC PROGRESS.—The Phenomena of Rain; Horseless Carriages, 443. The Light of the Starry Sky; The Value of the Future, 444.

ELECTRICAL PROGRESS.—Electricity vs. Compressed Air; Interesting System of Electric Tramways in Genoa; Air Compressing Devices; Disappear in the Electric Furnace, 444.

PRACTICAL INFORMATION.—Briquettes from Culm Heaps; Population Living in Cities of the United States; Iron Bar 2000 Years Old; Domestic Tin Industry; To Unite New York and Philadelphia by a Ship Canal; Training Locomotives, 444.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 446-7.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 454.

MISCELLANEOUS.—Concentrates, 439. A Few Points for Prospectors; The New University; Elevators of the Golden Feather Company, Butte Co., 440. The Cyanide Process; Turquoise Mining, 441. Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process; Africa's Condition, 442. Coast Industrial Notes; Personal; Obituary; Books Received, 445. List of U. S. Patents for Pacific Coast Inventors: Notices of Recent Patents, 448. Recent California Mining Incorporations; Recently Declared Mining Dividends; Commercial Paragraphs, 455.

The Government's Mining Bureau.

The Los Angeles *Times*, in speaking of the proposal to establish a Secretaryship of Mines and Mining, says: "Just at present the Federal Mining Bureau is a portion of the Department of the Interior, and should remain so for a year or two longer, till some better reason than has yet been given can be adduced for the enlargement of the Cabinet or the multiplication of its functions."

None of those who have had business in Washington in connection with mining matters have ever been informed of the presence there of a Mining Bureau. There are bureaus almost without limit, but none of mining. There is not even a single clerk in any one of the departments whose business is in connection with mining matters. Mining is practically unknown to the Government officially.

Railroads, Electricity and Mine Development.

In Colorado it is a very poor mining camp that does not have at least two railroad connections with the outside world. In California even a single railroad approaches very few of the mines. To be sure, owing to the larger proportion of free-milling ore that can be worked on the ground, railroads are not so much of a necessity in this State. However, railroads could do a great deal for the mining industry in the Sierras. A difference of a few cents in the cost of supplies will in many places change loss into profit and mean the working of many thousands of tons of ore near the margin.

Better means of transportation and the development of the resources for power by the use of electricity will do much for mining in this State within the next few years. A company has been formed to build a road from Stockton into Amador and Calaveras counties and a number of companies have been formed in different parts of the State to supply electric power to the mines. One of these has contracted to deliver power to certain mines in Calaveras by May 1, 1897.

One of the greatest advantages that will come from the building of these electric plants will be the fact that an impetus will be given to prospecting and development work. Hundreds of owners of undeveloped mines, who cannot afford or do not care to risk the cost of independent power plants, would gladly avail themselves of the opportunities thus offered for getting enough power at a small proportion of what such plants would cost to prove their properties.

Director Walcott and the Geological Survey.

We are in receipt of a letter from Director Walcott of the U. S. Geological Survey that should be of considerable interest to mining men, in that it shows the Director's friendly attitude toward the mining industry and explains why all that is desired cannot at present be accomplished. It is as follows:

DEPARTMENT OF THE INTERIOR.
UNITED STATES GEOLOGICAL SURVEY.
WASHINGTON, D. C., Nov. 16, 1896.

TO THE EDITOR:—I have just read the editorial contained in your issue of November 7th on the Geological Survey and Mining and also Mr. Mark B. Kerr's letter on the Geological Surveys of the Gold Belt of California, and I fully appreciate the position that you take with respect to the desirability of pressing forward the surveys in the State in question.

While I was in the act of reading the editorial the first copy of the Nevada City Special Folio of the Geologic Atlas was laid upon my desk, a copy of which folio will be sent to you by mail. The field work pertaining to this folio was completed last year and the publication of the folio was taken up as soon as the author had completed his maps and text. It is not practicable to survey the entire area of the Gold Belt with the same detail, on account of the great expense that would be incurred. If the appropriations annually made for topographic surveys in the United States were divided proportionately among the several States there would be less than $4000 to be expended in each State; and the annual appropriation for geologic work is considerably less than that for topographic work. There is scarcely a State in the Union that has not mineral or other resources that require the benefits of topographic and geologic surveys. However, with the coming of more prosperous times, it may be that the appropriations for the prosecution of the work of the Geological Survey will be increased and, if so, the work in California will be correspondingly benefited, at least so far as the matter rests with me. Some of the States have co-operated with the National Survey in the topographic mapping of their areas, and in such States the surveys have advanced with much greater rapidity. Other States have local geologic survey bureaus that look after the local economic problems, which the National Survey necessarily does not investigate. Our aim is to prepare topographic and geologic maps upon which the local geologist, mining engineer and civil engineer may base their work. This is the general plan of procedure, though a few of the great mining centers are studied in detail in the course of our work, with a view to furnishing guides to the development of districts of a similar character. An example of this is shown in the Nevada City Special Folio.

During the season just closing two topographic sheets have been completed in the vicinity of San Francisco, and also a one-thousand mile sheet lying north of the Yosemite sheet in the Sierra. In addition to this, areal geologic work has been carried forward by Mr. Turner in the gold belt, and by Prof. J. C. Branner, of Stanford University, and Prof. Andrew C. Lawson, of the University of California, in the vicinity of San Francisco.

Yours with respect,
CHAS D. WALCOTT,
Director.

No better arguments in favor of a systematic geological survey on the part of the State as suggested by the State Mineralogist could be presented than appear in Mr. Walcott's letter. With such a survey established much of the work already done by the U. S. Survey would become of great practical value, where it is now like the framework of a building that needs finishing. But some plan must be adopted by which the work may be undertaken and carried out upon a system that will give assurance of reliable results. If there is to be a change of geologists with each new administration in this State we may not expect satisfactory work, for good men cannot be retained under such circumstances. The Mining Bureau has done good work in the past, but could have done much better had it not been in the power of every new Governor to change its personnel. Probably a good plan would be to have the directors of the Mining Bureau appointed for long terms, and hold them responsible for their employes. This is the way in which the University is managed, and it is by far the best managed of all our public institutions.

With such a governing body free from political influence the offices of the Geological Survey would be economically administered. Free from political "pulls," they could choose the best men to be obtained. In this connection it might be suggested that much of the work could be done by young graduates of the State University, most of whom would be glad to serve for nominal salaries. In this way a small appropriation might be made to do much work.

The Value of the Gravel Mines.

The early rains have been the cause of opening up a great many of the smaller hydraulic gravel mines especially in Siskiyou and Trinity counties where the debris question does not interfere. Those counties and southern Oregon will illustrate the value of hydraulic mining to the country. In 1895, Trinity was the fifth county in the State in the amount of gold produced with $1,305,412 to her credit, nearly a million of which came from gravel mines. The product from Siskiyou was $1,030,983 largely from gravel. In southern Oregon there have been so many new hydraulic mines fitted up for the coming season's run that the yield of the State will be very largely increased.

Placer county was the second in the list in 1894 and third in 1896, and a large part of her gold comes from placers—mostly, however, drift mines. It has been claimed by the anti-debris people that because the output of gold in Placer is so large, the closing of the hydraulic mines was not so great an evil after all. But they do not seem to understand that this large yield of gold comes not from the mines which were being worked by the hydraulic process, but mainly from the gravel, capped by deep lava, that would never have been worked in that way. Much of the gravel that is suitable for hydraulicking will not pay to drift, and, unless hydraulicking is resumed, will never be worked.

At the time of the debris fight great advances were beginning to be made in drift mining, and the closing down of the hydraulic mines had little to do with encouraging this drift mining except through forcing the hydraulic miners to seek new pursuits. Many went into drift or quartz mining, and so gave an impetus to those industries. In other counties where there had been considerable hydraulic mining the yield of gold fell off much more than in Placer, because there was no suitable gravel for drifting.

Low Grade Mines.

The so-called played out mining camp in this State is still the best field for mining. Many new districts have been opened up, but few of them hold out well. In the old camps that were worked in early days, and later comparatively deserted, the greatest proportion of the big mines of this State are to be found to-day. Many suppose that this is owing entirely to the discovery of new ore bodies. In a measure this is quite true, but the main reason is that with the reduced cost of mining and milling old and well-known ore bodies that would not pay a few years ago now yield large profits.

The proportion of the ore found years ago that would then pay to work was so small that the average life of the mining camps was short, and many, in view of their experience of earlier days, expect mining to "peter" out again soon. This probably leads many to sell out sooner than they would if they believed the present more than a passing excitement. A low-grade mine that is just too low grade to pay to work now is considered worthless. Yet far-sighted men might make worse speculations than to at least pay taxes on many of these, and wait for the time when, with further reductions in the cost of working, they may become valuable.

Salting.

It is very seldom that one hears now of cases of "salting" of mines in this State. No case of any large swindle perpetrated in this way has been recorded for several years. It is almost impossible, of course, to successfully salt a mine that is to be examined by one who has a good knowledge of sampling. In many of the cases in which swindles were perpetrated in this way years ago, the mines were examined and sampled by experts of known ability. There could only be one conclusion as to the cause, and that is that there was collusion between the expert and the seller. But that class of expert has had his day. Purchasers of mines now who rely upon the judgment of others have learned to know the men they are to rely on first.

Concentrates.

A NEW smelter is to be built at Vancouver, B. C.

THERE are five cyanide plants at Bodie working on old tailings.

MICA beds have been located on the Slocan river, in British Columbia.

A COLORADO firm proposes to erect sampling works at Spokane, Wash.

THE average value of Johannesburg, South Africa, gold is $16.50 per ounce.

BY the new stage line it is twenty-six miles from Kramer to Randsburg, Cal.

THE old experiment of a dry concentrator is to be tried in Lake City, Colorado.

THE Kentuck mine, Nevada, Cal., is about to be reopened after many idle years.

A TIN deposit is reported to have been discovered on Home creek in British Columbia.

A CUSTOM MILL is to be erected in the Deep Creek district in Utah for handling gold ores.

CINNABAR has been discovered in the main shaft of the Great Coolgardie Proprietary Blocks.

SEVENTY-SEVEN mining locations were recorded at Bakersfield, Cal., in the month of October.

BRITISH COLUMBIA miners think it is time for that province to have a B. C. Miners' Association.

MINING companies continue incorporating in the State of Washington at the rate of ten a day.

SOME mining locations have lately been made in the business part of the city of Spokane, Wash.

REPORTS of the sale of the Champion mine at Nevada City, Cal., are denied by Superintendent Fred Zeitler.

THE heavy rain and snow fall in the mountains insures plenty of water for the season's work in this State.

W. S. STRATTON says he will spend $100,000, if necessary, to bring Cripple Creek ore and plate thieves to justice.

THE new owners of the Alameda mine, near the Rawhide, in Tuolumne county, have decided to erect a 40-stamp mill.

AT Mercur, Utah, several of the big properties are being considered with a view to purchase by European capitalists.

AN electric road from Colorado Springs to Cripple Creek and Victor is to be built. It will be thirty-one miles in length and cost about $300,000.

LA FORTUNA MINING COMPANY of Arizona shipped lately a single bar of bullion to San Francisco valued at $92,535, the result of thirty days' run.

IN THE newly discovered gold mines at Russell, Kansas, it is claimed that ore that runs as high as $100 a ton has been developed in paying quantities.

THE recent indorsement of the good roads movement by the California State Miners' Association is meeting with affirmative echo all over the State.

THE founding of a School of Mines in Salt Lake, Utah, is being agitated, and it is proposed to ask the State Legislature to make an appropriation.

THE Mount Bischoff tin mine of Tasmania has produced 48,508 tons of tin ore of a value of £2,640,000, and has paid dividends amounting to £1,419,000.

IT is reported that August F. Heinze will soon erect a lead smelting plant with a capacity sufficient to treat all of the silver-lead ores in the Kootenay, B. C.

ON Texada island, near Vancouver, B. C., a cave has been found in which the floors are said to be of fine sand carrying fine gold and the walls of gold-bearing quartz.

THE output of the mines at Rossland, B. C., during the month of October exceeded that of any month to date. The total value of the output amounted to over $175,000.

A LARGE quantity of hydraulic machinery is being put in at different points in Jackson and Josephine counties, Oregon, and the mining season will be a brisker one than ever.

OWING to the large increase of business in the Kootenay country in British Columbia, the Canadian Pacific Railway has made a new division with headquarters at Nelson.

THE increase in the number of voters since 1892 has been far larger in Spokane than in the other cities of Washington. This is due to the development of mining about that place.

THE population of Cripple Creek is increasing. A proposed annexation of outlying districts, the Cripple Creek *Mail* claims, would, if carried out, give a population of 18,000 to 20,000.

THE Tortillata Gold Mining Company has been organized, under the laws of Wyoming, for the purpose of working the auriferous gravels in the Sacramento river above Keswick, Shasta county, with dredgers.

THE Bank of British Columbia has opened a branch at Sandon, B. C. There are two railways running to the town, and it is thronged with people. Owing to the small available building area the price of land is rapidly going up.

OF the Cripple Creek output, the October production gives a total of 16,000 tons, of which 7000 went to the mills, with an average value of $30 a ton. The remaining 9000 was of smelting grade, with an estimated average value of $75.

EVERY holder of an unpatented mining claim should see to it that claim jumpers will find scanty picking on Jan. 1st, '97. But 34 days remain in which, if not already done, the $100 worth of work or improvements for '96 can be performed.

JUDGE CATLIN of Sacramento has issued a writ of mandate to the California State Controller compelling him to pay the withheld salary of R. I. Thomas, as secretary of the State Debris Commission, from January to June, 1896, amounting to $750.

PROSPECTORS' classes in mining centers have been adopted in Ontario under the direction of the Government, and the policy of placing mineral collections of a mixed economic and scientific character in localities where mining and prospecting are carried on has also been adopted. The Provincial Government has caused lectures to be given in Victoria, Vancouver, New Westminster and Nanaimo.

IN view of the recent cyanide patent decision in the Transvaal, S. A., the compilation on page 441 of this issue is particularly timely, being a compilation up to date of references to recent literature on the subject of the cyanide process in general.

THE good work being done by the Northwest Mining Association, which is composed of members from British Columbia as well as from the northwest mining States, has caused the suggestion of the formation of a British Columbia Mining Association.

NEWSPAPERS in the mining counties of this and other States are interviewing the most prominent residents of their respective localities regarding their views on the proposed cabinet office of Secretary of Mines and Mining. The replies are almost unanimously in favor of the idea.

CHAS. G. YALE, statistician of the U. S. Mint, has compiled a review of the gold production of this State from 1848 to 1895, inclusive, figuring an aggregate of $1,265,217,217. This enormous amount is but an index, a surface indication of the amount of gold yet to be mined in California.

THE suggestion of the Leadville, Colorado, Miners' Union for a sympathetic strike, tying up all mines in the State, and similar action throughout Montana, does not meet with favorable response, the general idea being that it would be folly to further extend the present trouble at Leadville.

NAMES are already being suggested for the proposed position of Secretary of Mines in the President's cabinet. It is very premature. The name of the probable incumbent is the last thing to consider. A vast amount of work is necessary before the consideration of any name is of any avail.

THE production of copper in Japan is increasing. The exports in 1895 were 6500 tons, 7100 tons in 1894 and 7000 tons in 1893. The decrease in exports in 1895 was partly due to the smaller shipments to China and partly to the large demand at home, chiefly for use in manufacturing war material.

IT is officially announced at Duluth, Minn., that the Rockefeller Iron Syndicate has sold $500,000 worth of Minnesota ore, to be delivered next season, and 60,000 tons of Spanish-American ore. This will enable the underground mines on the Mesaba range to resume operations at once and will give employment to thousands of men.

A MEETING was held in Rawlins, Wyoming, last week to form a mining exchange. The late discoveries at Grand Encampment and at other districts in the neighborhood make the city the center of considerable mining activity. The question of improved roads to various mining camps tributary to Rawlins was discussed at the meeting.

ONE result of the election is the publication of predictions of mining booms in the gold districts. In Colorado this is especially noticeable, and the sale of the Tom Boy to the Exploration Company and the presence in that State of a number of representatives of European capital have had much to do with increasing activity in the gold districts.

A. H. LACY and A. R. Bryson of Los Angeles, Cal., have a $100,000 bond on the Barenos gold property at San Francisquito, Lower California, 350 miles south of San Diego, on the gulf coast of the peninsula. The property is said to be sufficiently valuable in quantity and quality to justify placing schooners on the gulf and building a road to the shore line.

THE results of close competition in some lines of business is illustrated by the report of the Giant Powder Company at its annual meeting last Wednesday, when it was shown that during the year 7,000,000 pounds of powder had been made, on which the profit was $1700. In the face of such meager profits it would look as if competition may give place to consolidation.

IT IS reported from London that Captain De Lamar has given to an English syndicate an option on the De Lamar mine in Lincoln county, Nevada, but this is denied at the company's headquarters at Salt Lake. It is claimed that the income from this property amounts to about $2,000,000 per annum. Usually the annual reports of the sale of this mine come earlier in the season.

THE three mills of Deadwood, South Dakota, are treating 500 tons of siliceous ore per day, an increase of 100 per cent within a year. According to the Black Hills *Times* these ores will average $20 per ton, which is a low estimate, making the product $300,000 a month and over three and a half millions of dollars a year, which is greater than that of the Homestake and associate properties.

AIRSHIPS have been seen in the Sacramento sky, and during the next thirty days the chicken in Josephine Co., Oregon, with $1.38 in coarse grain gold in its crop, and the hemlock roots in Skagit, Wash., yielding visible gold in their ashes, should be heard from. All three stories were due November 15th. The Yuma, Arizona, white gold that sells for $24 per ounce is very late in reporting this year.

IT IS proposed to bring forward a bill at the next session of the Legislature to prevent aliens from locating mineral land in British Columbia. The British Columbia *Mining Record* says of this: "The aliens have hitherto located ground in British Columbia and enriched the province by many millions of dollars. They have spent their labor and experience in the country, and there are many rich mines to show for it."

SPEAKING of the formation of local mining laws by miners' meetings, in a recent article, ex-President Harrison says: "The limits of a claim and the distribution of the water supply were prescribed and established and every man became a warranter of every other man's title. These camp legislators had this advantage of Congress and of all other legislative bodies that I know of—they had a good practical knowledge of the subjects they dealt with."

THE Spring Valley hydraulic mine at Cherokee, Butte Co. Cal., was sold last Saturday by receiver J. B. Whitcomb to attorney T. Z. Blakeman of San Francisco, for the bondholders, for $275,000. The property consists of several hundred acres of mining ground and dumping ground, as well as many miles of water ditches. It has been in litigation for several years. Other parties to the suit have six months to redeem it. Unless this is done, it is expected that the bondholders will open the mine by drifting, and employ several hundred men.

A MINING MAN, speaking of the new State Line district in the Salt Lake *Tribune*, complains that the law of Utah is lamentably lax in allowing one man to locate a hundred claims upon which the only labor expended is the erection of monuments. If forty or fifty men owned the mines of State Line, instead of the eight or ten who now control all the claims, that country would boom, because there would be some money invested and some work done. This is often the case in new mining camps, and is especially noticeable in this State. No stronger argument could be found in favor of the proposal that this State should adopt such laws as the MINING AND SCIENTIFIC PRESS has had prepared.

A CALAVERAS paper estimates that there were employed in that county 1200 miners in 1895, when the mines produced $1,718,000, and goes on to say: "Counting miners' wages at $3 per day, and allowing 300 working days in the year, it will be seen that every dollar of gold produced costs about $2 for labor alone." That conclusion is not apparent after multiplying by the rules now in use in public schools. Twelve hundred miners working 300 days at $3 per day would receive $1,080,000. Comparing this with the output, and taking into consideration the fact that a large proportion of the men were employed in developing properties that will in time produce gold, but were not doing so in 1895, the showing is very favorable.

THE annual report of the superintendent of the Eureka Consolidated Mining Company of Nevada shows that the company has been able to continue working its mines, notwithstanding low prices in the metal market, owing to the percentage of gold contained in the ores. The report shows the following figures: Sales of ores, $35,590; sundry receipts, $14; balance from previous year, $8365; total, $43,969. The payments were: Tribute ore, jiggings, etc., $12,723; ore freight to Salt Lake, $12,131; sampling, $399; mine expenses, $5547; general expenses, Eureka, $3682; expense account, San Francisco, $6761; total, $41,243. This leaves a balance of $2726 forward to new account. The company intends to continue development work on such a scale as the cash in hand will permit.

A UNITED STATES surveyor, in running a line between the timber reservation and the Muscanapahe rancho in San Bernardino county lately, discovered a witness tree at a station which has been in dispute for many years and over which thousands of dollars have been spent in litigation. In following the field notes of surveys made twenty-nine years ago, he came to a point which called for a witness tree. Seeing an old sycamore with a slight discoloration on the bark, he began to cut with his ax and split off a large slab from the trunk, when the original marks as called for in the notes were clearly revealed, as perfect in form as when freshly cut. This reestablishes the original survey of the rancho and gives to the settlers and the reservation valuable land and water rights heretofore claimed as belonging to Muscanapahe rancho.

LAST March, in accordance with a request of the California Anti-Debris Association, Governor Budd instructed E. E. Leake, Commissioner of Public Works, to make a report on the effect of restraining dams on debris caused by hydraulic mining, their relation to navigation, etc.—seven questions in all. The chief and assistant engineer to the Commissioner of Public Works have just made public their report, which is not at all what the anti-debris people expected or hoped for. Messrs. Price and Nurse say that a comprehensive and intelligent answer to the questions requires the possession of data that do not exist; that what has been done was done under the direction and subject to the inspection of eminent engineers; that the work in question appears to fill the requirements, and that to exhaustively answer the queries would require more time and money than is at the disposal of the respondents. The questions were framed in demagogic shape, implying that what they tacitly assumed to inquire about was so, and that investigation would so demonstrate. The answer of the State officials is dignified, impartial and manifestly just.

REGARDING silver the outlook is promising. It is the reported policy of the President-elect to retire the greenbacks, increase the volume of national bank notes, coin the silver bullion in the United States treasury and make provision for renewed purchase of silver to be also coined, it being expected that in a comparatively short time the country will cease having a paper money that can call for redemption in gold, thus obviating the necessity for a "gold reserve." The political aspect of the silver question is not confined to the United States. Its international importance is one of the reasons for believing that the white metal will appreciate in value. Russia's vast schemes in the Orient have included the necessary acquirement of gold and silver. The former has been secured. Russia now wishes five hundred million dollars in silver for use in her political aggrandizement as opposed to England in China and India, the great silver absorbents. In those countries the superior power offering silver is more powerful than with an army. Russia recognizes the potency of silver in her conflict for supremacy with England in the Orient, and proposes to play that for all it is worth. It is a great game between England and Russia for predominance in the territory mentioned, but chiefly interesting to American silver miners for its likelihood to favorably affect and supplement any friendly silver legislation in this country.

UNITED STATES CONSUL MARATTA, at Melbourne, has forwarded to the State Department at Washington the returns of the Melbourne branch of the royal mint of England. The returns are of much interest in connection with the gold discoveries in the colony of West Australia. Almost all the gold produced in that colony is brought to the Melbourne mint, and a pretty sure criterion of the progress (or otherwise) of the industry is thus furnished. For the first nine months of the current year the Melbourne mint has received only 152,259 ounces of gold from Western Australia, against 160,949 ounces last year, a decrease of about 8,690 ounces. Taken in conjunction with the exceedingly unsound boom now in full career at Perth, the capital of that colony, the falling off is an unhealthy omen. It would be unfair, however, says the consul, to be too pronounced until the gold fields are in proper working order, but there is obviously room for the exercise of a great deal of caution on the part of investors. As regards receipts of gold by the mint from other sources it is very satisfactory to note that Victoria has, up to the present, supplied 580,330 ounces, against 526,570 ounces for the corresponding period of 1895, and if the same rate of increase is continued, the production of the colony for 1896 will be about 775,000 ounces. Imports of gold from New Zealand and Tasmania show large increases, but much less has been received from South Australia. The total quantity of gold received by the mint from January 1st to September 30th this year is 857,641 ounces, against 785,752 ounces for the corresponding period of last year, the increase being 71,889 ounces.

A Few Points for Prospectors.

Written for the MINING AND SCIENTIFIC PRESS by DAN DE QUILLE.

The first requisite for the formation of a mineral vein is a fissure or fracture extending down through the earth's crust to the underlying heated regions. The fissures occupied by mineral veins are, in most cases, caused by the upheaval of mountain masses of granite or some other igneous rock. This being the case, we may expect to find the widest, deepest and richest ore veins on the flanks of the strongest and most elevated portions of a mountain range, at points which were centers of great disturbance at the time of the upheavals of the range under observation. As the most elevated peak of a range must have come up from a greater depth than those parts forming the extremities of the chain, the lodes found about it are likely to be larger and stronger than those situated at or near the points where the extremities of the range sink to the general level of the country.

This being the case, a good rule for the prospector to observe on entering a new region of country in search of veins of the precious metals is for him to direct his course to the main mountain range of the district and to the culminating peak of that range. As veins of gold and silver-bearing quartz are more frequently found in the neighborhood of igneous rocks than in any other situation, the place in which to search for them is evidently in mountainous regions, as the upheaval of masses of igneous rocks has in most cases caused the elevation of mountains.

Mineral veins, and particularly those of gold and silver, may be said to be a consequence of the upheaval of mountain ranges, and usually ore belts have an extent and importance corresponding to the greatness of the chain in which they occur. That mineral belts cease with the ranges in which the mineral belts are found shows that they are dependent on or a result of the upheaval of the ranges.

No two systems of veins are alike in all respects, and each must be studied by itself. Each mineral belt or system of veins seems complete in itself, and is the result of local events and conditions. The points of difference in veins and systems of veins, however, are matters to be observed and studied by the careful miner. The general rule in regard to the occurrence of mineral veins is that they are usually found in localities where igneous rocks, as dikes, have burst up through crystalline schists (altered sedimentary rocks) or stratified deposits, will hold good in nearly all regions.

Although I have given it as a good rule for the guidance of persons exploring new regions to strike for the culminating point of a range, I do not wish to have it understood that I mean to send the prospector to the top of the main peak to look for a big mine. The place in which to prospect is on the flanks of the big peaks. As lodes are most frequently found about the point of junction of dissimilar rocks, it will be well for the prospector, as a first move, to search for the point where the upheaved igneous rock first shows itself above the sedimentary formation through which it has pushed its way. A good vein is liable to be found between the two kinds of rocks. A vein so situated is known as a "contact" vein. Should no vein be found at the contact, a vein or a series of veins may most likely be found lower down, at points where fissures were formed in the sedimentary rock at the time when the igneous mass of the mountain was thrust up through it. Also, there may be on the lower part of the mountain dikes of trachyte, diorite, or other igneous rocks, and in conjunction with these good veins are liable to be found.

Where that portion of a mountain which rises above the contact is a uniform mass of granite or other igneous rock, there is little hope of finding large or valuable veins; yet, if there should be dikes of porphyry or other rock of a similar character cutting across the rock constituting the bulk of the mountain, good veins are liable to be found about the dikes. Also, it is to be remembered, that in places lodes not unfrequently appear on the surface of a sedimentary formation when the igneous dikes that produced the fissures which they fill are not visible, but are lying at some depth below, where they were halted in their upward course after having fractured the overlying country rock. Dikes of igneous rock running through a sedimentary formation or through large areas of other igneous rocks are always a good feature, and such indications of disturbing events in a section of country should always receive the earnest attention of the prospector. Dikes are frequently seen in places where no cropping of quartz veins appears. In such places veins running parallel to the dike may be found below it hidden by a covering of debris, or at the depth of a few feet there may be a contact vein on one side or the other of the dike.

The reason why mineral veins are most frequently found in connection with igneous rocks is that these rocks in bursting up through the overlying stratified rocks form fissures that extend down to the heated subterranean regions and afford passage for the upward flow of the mineral-charged waters, vapors and gases, through the action of which the fissures are filled with quartz and ores. Fissures are also formed by earthquakes and by the shrinkage of the crust of the earth. These, however, seldom contain veins of minerals, as they are widest at the top and do not extend downward to a sufficient depth to tap the heated regions beneath the earth's crust, whereas the other class of fissures start from the fiery regions and make their way to the surface alongside upheavals of igneous rocks. Some earthquake cracks and shrinkage fractures have probably been filled with mineral matter through the accident of an upheaval of igneous rock having occurred beneath them. But fissures of this class are generally found in valley regions at a distance from the main granite mass that forms the core of the culminating mountain range of the district, and are found to be filled with barren material deposited from solutions in cold surface water. The filling of such veins is known to the miners of some California camps as "he quartz."

The lodes to which the miner should give his attention are those that occur at or about the junction of igneous with sedimentary or metamorphic rocks. Although the geologists have a thousand names for the many subdivisions of rocks, all the prospector need know for his use are the two kinds—igneous and sedimentary. The igneous rocks are such as have come up from unknown fiery depths, and all the others are of sedimentary origin, being formed from material furnished by the erosion and decomposition of the igneous rocks.

All rocks formed on the surface of the earth from the debris of the old rocks are sedimentary, and the sedimentary rocks altered by heat, pressure and crystallization are called metamorphic. All other rocks are igneous, but these rocks differ greatly among themselves in texture and in many other respects. The volcanic rocks are those formed during the present and Tertiary periods. They have been ejected from volcanoes and are lavas of different kinds. No mineral veins of value will be found in such rocks. The igneous rocks, which were mostly solidified beneath the surface of the earth under great pressure (known as plutonic rocks, as granite, porphyry, trachyte and the like), are those of interest and value to the prospector.

Lodes are always more recent than the rocks they traverse, and older than the rocks or lodes by which they are intersected. Each vein system owes its existence to local events and conditions, both at the surface and at depth in the unknown subterranean regions. Each system of veins being complete in itself, the careful mining man will thoroughly examine and closely study the peculiarities of the particular system, and also of the particular vein he undertakes to develop and work.

Although systems of mineral veins differ among themselves and are of different ages, there is to be observed in them a sort of family resemblance that often extends over very large tracts of a country. This becomes apparent when we compare the mineral systems of California with those of the Great Basin region, and the mines of Nevada and Utah with those of Colorado, Montana and Dakota; yet, while the family is much the same, the children all have their own peculiar features and characteristics within certain bounds.

While there are many different belts or systems of veins in California on and along the Sierra range, they are all gold-bearing and belong to one family. This family of systems extends along all that portion of the Sierra Nevada from well up toward the south line of Oregon southward down near San Bernardino county, where, at the Mohave desert, the range is broken. Southward, in Arizona and New Mexico, come in systems of veins which belong to a different family—a family with many of the features of the Great Basin families. The territory of this southern family begins in San Bernardino county, at a point where the big break in the range occurs. A split in a range, or a break in its continuity, seems to change the character of the contents of veins over wide areas, thus forming different families of systems. The systems of veins on the flanks of a range that is continuous show a family resemblance. Breaks or splits in ranges, however, nearly always change the character of the vein systems. This is seen in the changes from silver to gold in Mexico and Peru. In the Ural and Altai mountains there are silver sections and gold sections where breaks and splits occur. In these different zones are veins and systems of veins of different ages, each possessing special family features.

In the great mountain chain which extends along the Pacific coast in almost an unbroken line from Terra del Fuego to the Arctic ocean, a distance of 9000 miles, we have an immense range of igneous rocks that is rich in the precious metals in most places throughout its whole course. Gold and silver follow the main mountain ranges of the world, and richest and best known mines are nearly always situated on or near some prominent peak on each great chain. In the Rocky mountains, the Black Hills, the Urals of Siberia and in most of the great mountain ranges where there have been upheavals and intrusions of igneous rocks the same thing is seen. Also where gold and silver were found in one part of a great range these metals are likely to be found in all parts of that range, though in some places one of these metals may predominate, while elsewhere the other will be so abundant as to hold almost exclusive possession of large regions of country.

There is a sort of relationship between the main mountain ranges, with their accompanying dikes, and the belts or systems of ore veins. First we find a huge main upheaval of granite or some other igneous rock which forms the central part or core of a range and generally protrudes above the sedimentary through which it has pushed its way; next come the dikes on each side of the main mass or core and running parallel with it on and along the flanks of the range and generally in the uplifted sedimentary rocks forming the "country." Thus the igneous rocks form a system not unlike that of the systems of quartz veins. The quartz veins seem to follow this arrangement in their systems, there being a main central vein flanked by smaller parallel veins.

The majority of prospectors do not give the dikes the attention they deserve. Whether of diorite, porphyry or some other igneous rock, the dikes are among the best known indications of the presence of quartz veins. On entering a new region the prospector should first look for and examine the contact, and next he should turn his attention to the dikes and the quartz croppings below.

The New University.

J. B. Reinstein of the Board of Regents of the State University has started East for the purpose of explaining to the architects what is the situation at the University and what will be required to comply with the plan for the proposed architectural competition. Mr. Reinstein has conceived the idea of erecting buildings for the seat of learning that will be oriental in magnificence and splendor. There is nothing new in that. Every university man while in his undergraduate days has built up in imagination a great seat of learning with magnificent structures to take the place of the sorry makeshifts of nondescript styles of architecture that now occupy the most beautiful college site in the world. But they have been built up only in imagination. With Mr. Reinstein to conceive was to execute. The dreams of all Berkeley men will be more than realized. Of course, Mr. Reinstein appreciates as well as any one else that buildings alone will not make a university great, and his plans include schemes for large endowments and the building up of an institution whose call may be considered an honor to any man of learning in the world.

The first fruits of the work that has been done is the splendid generosity of Mrs. Phœbe Hearst, which will enable the Board of Regents not only to go on with the work of preparation of plans but also to make a good start with the buildings. Aside from this, Mr. Reinstein has been promised large sums that will go toward erecting buildings or to the endowment funds. His plans include a mining school that shall be superior as to its faculty and in equipment to any in the world.

As to the preparation of the proposed plans, it is intended to offer prizes that will attract the architects of the world and the competition will become the first one of its kind of an international character. Mr. Reinstein states that the programme will provide, probably, for two competitions—a preliminary and a final one. A Board of Five Advisory Expert Architects will be established, one to be appointed by the Minister of Fine Arts of France, one by the Minister of Fine Arts of Germany, one by the Royal Institute of British Architects, one by the Head Chapter of American Architects at Washington, D. C., and one by Chapters of American Architects in California. The data, such as contour maps, casts, photographs and the like, will be distributed by the persons appointing the Advisory Board of Experts. Identity of the authors of all plans will be kept strictly secret, and probably six months' time will be given to the architects for the preliminary competition and as much more for the final competition. The Advisory Board of Architects will select from the plans submitted at the preliminary competition a number, say fifteen, the authors of which will receive each a prize of at least $500 and be requested to enter the final competition wherein their plans and ideas will be amplified and put into greater detail. From the plans submitted at the final competition, five will be selected for prizes. The author of the first and winning plan will have the construction of all buildings erected within, say, twenty-five years, and pursuant to his plans, or possibly he may be given some alternative prize. The authors of the remaining four will have distributed among them, say $5000. All matters connected with the competition, however, are indeterminate until the Board of Regents adopts the final programme for the architectural competition.

THE two elevators of the Golden Feather Company in Butte county lift eighteen thousand gallons of water each twenty-four hours over fifty feet, or two thousand tons of gravel per hour the same distance. They use 460 inches of water with a pressure of 155 pounds to the square inch for each elevator.

The Cyanide Process.

References to Recent Literature on the Subject—From the Library of the University of California.

Compiled for the MINING AND SCIENTIFIC PRESS by MISS A. D. NORDHOFF.

1.—Books.

EISSLER, M.—Metallurgy of Gold, 4th ed., London, 1896, ch. 12.

FELDTMANN, W. R.—Notes on gold extraction by cyanide of potassium as carried on at the Witwatersrandt gold fields, Johannesburg, Argus Pub. Co., 1894.

HATCH, F. H., AND CHALMERS, J. A.—Gold Mines of the Rand, London, 1895, ch. 19.

SCHEIDEL, A.—The Cyanide Process, Cal. State Mining Bureau, Bull. No. 5, 1894.

WILSON, E. B.—Cyanide Processes, N. Y., 1896.

PARK, JAMES.—The Cyanide Process of Gold Extraction, Auckland, N. Z., 1896, 2nd ed.

2.—Articles in Periodicals.

AARON, C. H.—The Lixiviation of Ores with Cyanide Solution: Mining and Scientific Press, 1892, vol. 65; 4, 5, 6.

AARON, C. H.—Cyanide Process: Mining and Scientific Press, 1892, vol. 65; 157, 237.

AARON, C. H.—Cyanide Process in South Africa: Mining and Scientific Press, 1892, vol. 65; 332.

ANDREOLI, E.—Is the Use of Cyanide of Potassium for Gold Extraction Common Property? Eng. and Min. Jour., 1895, vol. 59; 411, 436.

ARGALL, PHILIP.—Cyanide Process: Eng. Mag., vol. 7; 806.

BENEDICT, W. DEL.—MacArthur-Forrest Cyanide Process: Eng. and Min. Jour., 1890, vol. 50; 593.

BLANDING, LOUIS.—Time a Factor of Success: Mining and Scientific Press, 1892, vol. 65; 7.

BRAND.—Ueber die Cyanid Langung von Golderzen: Chem. Industrie, 1895, vol. 18; 89.

BUTTERS, CHARLES.—Cyanide Plant: Inst. Civ. Eng. Proc., 1895, vol. 121; 1. Also in Eng. and Min. Jour., vol. 60; 417.

BUTTERS, CHARLES.—Siemens-Halske Process of Gold Recovery: Eng. and Min. Jour., 1896, vol. 62; 292.

BUTTERS AND CLENNELL.—Cyanide Process in South Africa: Eng. and Min. Jour., 1892, vol. 54; 341, 365.

BUTTERS AND CLENNELL.—Chemistry of the Cyanide Process: Eng. and Min. Jour., 1892, vol. 54; 391, 416. Same article: Chem. Centralblatt, 1893, vol. 1; 545.

CALLAHAN, T.—The Pielsticker Cyanide Process: Mining and Scientific Press, 1892, vol. 65; 396.

CHRISTY, S. B.—The Solution and Precipitation of the Cyanide of Gold: Amer. Inst. Min. Eng. Trans., vol. 26; Sept., 1896.

CUNO, C. F.—Cyanide Process for Extracting Gold and Silver: Eng. and Min. Jour., 1891, vol. 51; 59.

DEMARET, L.—L'Or dans l'Afrique du Sud. Rev. Univ. des Mines, 1895, vol. 30; 1.

DIXON, W. A.—On the Method of Extracting Gold, Silver and Other Metals from Pyrites: Eng. and Min. Jour., 1879, vol. 27; 351, 372, 407, 429.

EISSLER, M.—Cyanide Process for the Extraction of Gold: Chem. News, 1895, vol. 71; 100.

ENDLICH, F. M.—Cyanide Process for Extracting Gold and Silver: Eng. and Min. Jour., 1891, vol. 51; 86.

FELDTMANN, W. R.—Cyanide Process in the Transvaal Mines: Eng. and Min. Jour., 1894, vol. 58; 102, 126.

FELDTMANN, W. R.—The Cyanide Process: Eng. and Min. Jour., 1894, vol. 58; 218.

FURLONGE, W. H.—MacArthur-Forrest Cyanide Process for Treating Gold Ores: Eng. and Min. Jour., 1890, vol. 50; 501.

FURMAN, H. VAN F.—Laboratory Tests in Connection With the Extraction of Gold From Ores by the Cyanide Process: Mining and Scientific Press, 1896, vol. 73; 379, 402, 421, 441.

GARBUTT, F. A.—Commercial Status of the Cyanide Process: Mining and Scientific Press, 1892, vol. 65; 317.

GARBUTT, F. A.—Simplicity of the Cyanide Process: Mining and Scientific Press, 1892, vol. 65; 397.

GARBUTT, F. A.—Improved Tanks at the Sultana Mine: Mining and Scientific Press, 1893, vol. 67; 342.

GOYDER, G. A.—Action of Potassium Cyanide on Gold: Jour. Chem. Soc., 1894, vol. 66; 2, 416.

GOYDER, G. A.—Same Article: Chem. News, 1894, vol. 69; 262, 268, 280.

GOYDER, G. A.—Chemie des Cyanidprozesses: Chem. Centralblatt, 1895, vol. 2; 625.

JAMES, ALFRED.—Cyanide Practice: Mining and Scientific Press, 1896, vol. 72; 378.

JANES, B. E.—Cyanide Process at the Mercur Mines: Mining and Scientific Press, 1896, vol. 72; 418.

JANIN, LOUIS, JR.—Cyanide Process: Mineral Industry, 1892, vol. 1; 239.

JANIN, LOUIS, JR.—The Mercur Mining Company's Cyanide Mill: Mining and Scientific Press, 1893, vol. 67; 341.

JANIN, LOUIS JR.—The So-called MacArthur-Forrest Process: Eng. and Min. Jour., 1890, vol. 50; 685.

JOHNSTON, WM. D.—Gold Extraction by Potassium Cyanide: Cal. State Min. Bureau, Report 10; 958.

JOHNSTON, WM. D.—The Mining Bureau's Investigations: Mining and Scientific Press, 1892, vol. 65; 7.

KEDZIE, G. E.—Experiments With the Cyanide Process: Eng. and Min. Jour., 1892, vol. 54; 606.

KEDZIE, G. E.—Same Article: Jour. Soc. Chem. Industry, 1893, vol. 12; 325.

KNAPP, M. A.—A Cheap Cyanide Plant: Mining and Scientific Press, 1896, vol. 73; 296.

KNOETZER, —.—Extraction de l'or de ses Minerais par le Cyanure de Potassium: Bull. Soc. Chim. de Paris, 1893, vol. 9; 529-542.

KROUPA, G.—Anlage fur den Cyanidprozess in Worcester, Transvaal: Chem. Centralblatt, 1895, vol. 2, 1136; 1896, vol. 1; 71.

LODGE, R. W.—Cyanide Process as Applied to the Concentrates From Nova Scotia Gold Ore: Technology Quar., 1895; 389.

LOEVY, J.—Gold Estracktion mit Cyankalium: Chem. Centralblatt, 1896, vol. 2; 325.

MACARTHUR, J. S.—MacArthur-Forrest Process: Eng. and Min. Jour., 1892, vol. 54; 27.

MACLAURIN, R. C.—Sur le Desolution de l'or dans une Solution de Cyanure de Potassium: Bull. Soc. Chim., Paris, 1893, vol. 10; 661.

MACLAURIN, R. C.—Relative Weights of Gold and Silver Dissolved by Potassium Cyanide Solutions From Alloys of These Metals: Jour. Am. Chem. Soc., 1896, vol. 18; 1276.

MACLAURIN, R. C.—Action of Potassium Cyanide Solutions on New Zealand Gold and Silver: Jour. Chem. Soc., 1895, vol. 67; 199.

MACLAURIN, R. C.—Die Einvirkung von Wasserigen Cyankalium auf Gold und Silver in Gegenwart von Sauerstoff: Chem. Centralblatt, 1895, vol. 1, 628.

MACLAURIN, R. C.—Dissolution of Gold in a Solution of Potassium Cyanide: Jour. Chem. Soc., 1893, vol. 63; 724.

MCTEAR, JAMES.—On the So-called Selective Action of Cyanide of Potassium Used in Obtaining Gold, etc.: Mining and Scientific Press, 1895, vol. 71; 388.

MARTIN, WM., JR.—Cyanide Method of Extracting Gold from Its Ore: Am. Chem. Soc., 1896, vol. 18; 309.

MERLE, MARC.—Ubersicht uber die Fortschritte in der Behandlung der Goldmineralien: Chem. Centralblatt, 1895, vol. 2; 1137.

MERRILL, C. W.—Application of the Cyanide Process at the Mercur Mine: Eng. and Min. Jour., 1892, vol. 54; 440.

MERRILL, C. W.—Present Limitations of the Cyanide Process: Amer. Inst. Min. Eng., 1895, vol. 25; 102, 685.

MERRILL, C. W.—Same Article: Mining and Scientific Press, 1895, vol. 71; 5.

MORTON, —.—Cyanide Process: Mining and Scientific Press, 1892, vol. 65; 204.

MOSENTHAL, H. DE—Treatment of Gold Ore at the Witwatersrandt Gold Fields: Jour. Soc. Chem. Ind., 1894, vol. 13; 40, 326.

MULHOLLAND, —.—Der Bromcyanid Prozess zur Goldextraktion: Chem. Centralblatt, 1896, vol. 1; 876.

PACKARD, G. A.—Cyanide Process in the United States: Mining and Scientific Press, 1896, vol. 73: 316.

PAUL, A. B.—MacArthur-Forrest Process: Mining and Scientific Press, 1893, vol. 66; 36.

PAUL, A. B.—Experiments in California: Mining and Scientific Press, 1892, vol. 65; 3, 4.

PEARCE, —.—Refining Gold in Colorado: Mag. of West. Hist., vol. 11; 67.

SCHNEIDER, E. A.—Cyanidprozesses oder Chloration: Chem. Centralblatt, 1896, vol. 1; 876.

SCHNEIDER, E. A.—Contribution to the Chemistry of the Cyanide Process: Eng. and Min. Jour., 1895, vol. 60; 489, 514.

SCHNEIDER, E. A.—Does Cyanide of Potassium Dissolve Gold?: Eng. and Min. Jour., 1894, vol. 58; 483.

SMITH, TH. N.—Cyanide Process at the Utica Mine: Mining and Scientific Press, 1896, vol. 73; 258.

WARWICK, A. W.—Rate of Solution of Gold in Cyanide Solultion: Eng. and Min. Jour., 1895, vol. 59; 604.

WELLS, J. S. C.—Zur Chemie des Cyanid Processes: Chem. Centralblatt, 1896, vol. 1; 775.

WELLS, J. S. C.—Chemistry of the Cyanide Process: Eng. and Min. Jour., 1895, vol. 60; 559, 584.

WILSON, E. B.—Is Potassium Cyanide a Solvent for Gold? Eng. and Min. Jour., 1896, vol. 61; 5, 443.

WILSON, E. B.—Stamp Mill and the Cyanide Process: Eng. and Min. Jour., 1895, vol. 60; 415.

Unsigned Articles.

Big Chlorination and Cyanide Works.—Mining and Scientific Press, vol. 67: 276.

Cyanide and Chlorination.—Mining and Scientific Press, vol. 72: 25.

Cyanide Process.—Eng. and Min. Jour., vol. 54: 316; vol. 58, 314.

Cyanide Process.—Mining and Scientific Press, vol. 65: 3, 188; vol. 66: 53; vol. 67: 182.

Cyanide Process.—Jahresb. Chem. Technol., 1893, vol. 15: 55; 1894, vol. 25: 284.

Cyanide Process on the Rand.—Mining and Scientific Press, vol. 69: 278.

Cyanide Process in South Africa.—Mining and Scientific Press, vol. 67: 54; vol. 66: 148.

Cyanide Process in the United States.—Eng. and Min. Jour., vol. 62: 386.

Cyanide Process in Victoria.—Eng. and Min. Jour., vol. 59: 582.

Cyanide Process, Extension of.—Eng. and Min. Jour., vol. 59: 533.

Cyanide Process, Improvements.—Mining and Scientific Press, vol. 69: 245.

Cyanide Process, Is it Economical?—Mining and Scientific Press, vol. 65: 285.

Cyanide Process, Losses by.—Mining and Scientific Press, vol. 67: 356.

Cyanide Process, Suggestions.—Mining and Scientific Press, vol. 66: 68.

Experience at Mercur.—Mining and Scientific Press, vol. 65: 10.

Extraction von Golderzen nach den Vorschlagen von der Wilde.—Chem. Industrie, vol. 18: 93.

Golden Bar Plant, Coolgardie.—Eng. and Min. Jour., vol. 59: 486.

MacArthur Process.—Mining and Scientific Press, vol. 65: 7, 61; 66: 36.

MacArthur Process.—Jahresb. Chem. Technol., 1894, vol. 25: 286.

MacArthur Process.—Chem. Industrie, 1895, vol. 18: 89.

MacArthur Process.—Dingler's Polyt. Jour., 1895, vol. 297: 87.

MacArthur So-called Process.—Eng. and Min. Jour., 1892, vol. 53: 539.

New Gold Processes.—Mining and Scientific Press, vol. 72: 130.

Patents, MacArthur's.—Mining and Scientific Press, 1892, vol. 65: 11, 12.

Patents, MacArthur's.—Eng. and Min. Jour., vol. 58: 122; vol. 61: 225, 273.

Patents, MacArthur's, English Decision.—Eng. and Min. Journal, 1894, vol. 58: 1, 486.

Patents, Simpson's.—Mining and Scientific Press, 1892, vol. 65: 12.

Siemens-Halske Process.—Chem. Industrie, 1895, vol. 18: 91.

Solvent Processes.—Mining and Scientific Press, vol. 65: 1.

Work on Tailings.—Mining and Scientific Press, vol. 65: 9.

NOTE.—Other short paragraphs and less important notices are in the MINING AND SCIENTIFIC PRESS, volumes 65 on, and in the *Engineering and Mining Journal*, volumes 53 on.

University of California, Berkeley, Nov. 14, 1896.

Turquoise Mining.

The British consul-general describing the turquoise mines near Nishapur in Persia, says: "These are believed to be the only mines in the world which have been worked extensively, or which have produced the turquoise of perfect shape and color. There is no system and no attempt to work on rational lines. The lessees have but one object, and that is to recoup their outlay, and then to amass what profit they can in the speediest manner possible, for they know that in spite of the terms of the concession if a higher bidder turns up they may be abruptly ejected at a moment's notice.

The Reish mine, which is the only one worked on a large scale or with vigor, and which produces the greater part of the turquoises at present sent to market, is near the top of one of the highest ridges, at an altitude of about 6000 feet above sea level. The entrance to the mine is a hollowed out cave, about 12 yards across, with a vertical shaft some 5 yards in diameter. Two men were reclining at the mouth of this shaft with their backs against the wall of the cave, and turning with their bare feet a ricketty wooden wheel, which brought up the debris from below in a small sheepskin bag, holding no more than a peck perhaps. This bag was received by a third man, who unhooked, emptied and reattached it. The other two men removed their feet, and the bag went down with a run some 40 feet, where three other men were similarly engaged on a ledge in the shaft. The mine itself is some 80 or 90 feet from the surface, but the descent was impracticable in boots. The miners first descend by means of a narrow diagonal tunnel, and then scramble down the rough sides of the shaft.

At the mouth of the cave, which is on the precipitous hillside, half a dozen men were seated close together on a ledge, breaking with small hammers the fragments of rock as they were brought up from below. When a turquoise was discovered it was placed on one side in its rough state, encased in rock, and in that state was sent to Meshed. About and around the cave, perched on other ledges, were numbers of small boys sifting the earth or soft debris which had been brought up with the rock from below. The bags came up pretty fast, and seemed to contain a vast number of turquoises of all sorts. Unfortunately, though the mine is very productive

and the turquoises of good shape, their color soon goes. There are about five or six other mines of modest proportions, where work is carried on by a few men. All the rest are mere burrows, with just enough room for a man to enter in a cramped position, and extend, most of them, only a few yards diagonally from the entrance. The old Abdur Rezai mine is on the extreme east, was very extensive, and produced superb turquoises of lasting color, but fell in a few years ago.

Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process.*

NUMBER IV.

By H. VAN F. FURMAN, Denver, Colo.

The results of the experiments still prove the applicability of the process to the ore in question, and the best method of treatment, i. e., the strength of solution and the mesh which will give the best extraction in the shortest time, with the least consumption of cyanide.

Where it is desired to treat larger quantities of ore a very convenient apparatus is a large glazed earthenware jar, provided with a false bottom and an outlet at one of the lower sides.

The following formula will be found convenient for calculating the percentage of extraction :

Let A = The assay value of the ore in ounces Troy per ton of 2000 pounds Av.
B = Milligrammes of gold found in filtrate.
C = Pounds Av. of ore taken for treatment.
X = The percentage of extraction.

$$X = 6.43016\frac{B}{AC}.$$

IV.—DETERMINATION OF THE CAUSE OF CYANIDE CONSUMPTION.

Should the consumption of cyanide be high, the cause of consumption may be determined by an analysis of the cyanide solution. For every part of the cyanide rendered inoperative a corresponding proportion of metal enters solution. Thus one part by weight of iron consumes seven parts by weight of potassium cyanide, etc. The following equations represent the reactions most frequently encountered :

$$Fe\,SO_4 + 6KCN = K_4\,Fe\,(CN)_6 + K_2\,SO_4\,;$$

Or

56 (at. weight of Fe): 390 (mol. wt. 6KCN) : : 1 : 7.

$$Zn\,SO_4 + 4KCN = K_2Zn\,(CN)_4 + K_2\,SO_4\,;$$

Or

65 (at. wt. Zn) : 260 (mol. wt. 4KCN : : 1 : 4.

$$2\,Cu''SO_4 + 6KCN = K_2\,Cu'\,(CN)_4 + 2K_2\,SO_4 + 2CN.$$

Salts of aluminum and magnesium act in a different manner with potassium cyanide, their hydrates being formed with the liberation of hydrocyanic acid, thus :

$$Al_2\,(SO_4)_3 + 6KCN + 6H_2O = Al_2\,(OH)_6 + 3K_2SO_4 + 6HCN$$

$$Mg\,SO_4 + 2KCN + 2H_2O = Mg(OH)_2 + K_2SO_4 + 2HCN.$$

A preliminary alkaline treatment overcomes this objectionable feature, their hydrates being precipitated, which are then inert towards potassium cyanide, thus :

$$Mg\,SO_4 + Ca\,(OH)_2 = Mg\,(OH)_2 + CaSO_4$$

insoluble magnesium hydrate and insoluble calcium sulphate being formed.

Soluble sulphides, formed by the action of potassium cyanide on some metallic sulphides, again react to some extent on the cyanide, with the formation of sulpho-cyanide of potassium, thus :

$$ZnS + 4KCN = K_2Zn(CN)_4 + K_2S$$

$$K_2S + KCN + H_2O + O = 2KOH + KCNS.$$

To determine the cause of the consumption of cyanide place 100 grammes of the pulp in a wide-mouthed bottle, add 200 c.c. of the cyanide solution and agitate for fifteen hours. Filter ; take 20 c.c. of the filtrate (equivalent to 10 grammes of ore) and evaporate almost to dryness in a porcelain dish. Add some strong sulphuric acid, evaporate almost to dryness, and cool. Dilute with water, add some hydrochloric acid, and heat to effect solution if necessary. The metal in solution may now be determined by the usual methods.

The strong sulphuric acid at a high temperature decomposes the metallic cyanides, thus :

$$2AgCN + 3H_2SN_4 + 2H_2O = Ag_2SO_4 + 2NH_4HSO_4 + 2CO_2.$$

Strong nitric acid may be used in place of strong sulphuric ; but hydrochloric cannot be used, as it leaves the metal in the form of a double cyanide salt, which is soluble.

The reactions with nitric and hydrochloric acids are :

$$AgCN + HNO_3 + 2H_2O = AgNO_3 + CO_2 + NH_3 + H.$$

$$K_4Fe(CN)_3 + 4HCl = H_4Fe(CN)_6 + 4KCl.$$

*Transactions Am. Inst. M. E., September, 1896.

V.—DETERMINATION OF THE CAUSE OF NON-EXTRACTION.

Should the above tests show a low percentage of extraction, the next step is to determine the cause of this non-extraction. It may be due to numerous causes, such as total destruction of potassium cyanide by certain salts of the base metals present in a form readily attacked by the potassium cyanide ; the gold may be in a very coarse state, in which case the solvent action of the potassium cyanide will be too slow for the practical application of the process ; the gold may be combined or alloyed with tellurium, antimony, bismuth, etc., in which case the cyanide is inoperative until the combination is broken up ; the presence of soluble sulphides in solution; the character of the gangue, such as kaolin or talc, which may be present in such quantities as to effectually prevent percolation. To overcome these difficulties the following methods may be tried :

In the case of an ore which consumes a large quantity of cyanide, if a preliminary wash with water, weak acid or alkali is ineffective, the ore may be classed as one not adapted to the process.

The coarse gold difficulty may be overcome by amalgamation, either before or after treatment with cyanide, which generally results in an excellent extraction. The South African practice may be cited as an example.

The difficulty due to the presence of bismuth, antimony, etc., in combination or as an alloy with the gold, may sometimes be overcome by fine grinding and long contact with the cyanide solution ; but the usual method is to treat the ore to a preliminary roast, which converts the gold into a condition in which it is readily attacked by cyanide.

The difficulty due to the presence of soluble sulphides can be overcome by the addition of a soluble lead salt or the addition of an oxidizing agent.

Should the ore contain much kaolin or talc, if coarse crushing is ineffectual nothing further can be done, and the ore must be classed as one non-adapted to the process.

Ores containing considerable quantities of oxidized copper minerals are to be classed as not adapted to the process.

VI.—DETERMINATION OF THE FREE POTASSIUM CYANIDE IN SOLUTION.

A number of methods have been proposed, and there are several which give good results when the solution is free from cyanides other than potassium cyanide. With complex mill solutions, containing $K_2Zn(CN)_4$, these methods fail.

With pure solutions, such as the freshly prepared stock solution, a rapid and accurate determination may be made by titrating a measured quantity of the solution to be tested with a standard solution of silver nitrate, using two or three drops of a 5 per cent solution of potassium iodide as an indicator. Silver cyanide is formed, and immediately redissolves in the excess of potassium cyanide. The reaction is as follows :

$$AgNO_3 + KCN = AgCN + KNO_3.$$

$$AgCN + KCN = KAg(CN)_2\,;$$

Or the reaction may be expressed as follows :

$$2KCN + AgNO_3 = KAg(CN)_2 + KNO_3.$$

As soon as all the potassium cyanide has been converted into the double cyanide of potassium and silver an additional drop of the silver nitrate solution produces a pale yellow opalescence, owing to the formation of silver iodide. The quantity of silver solution added is read off from the burette and the percentage of potassium cyanide is calculated.

In the United States a solution containing 6.535 grammes of silver nitrate to the liter is used. The quantity of cyanide solution usually taken is 10 c.c. When 10 c.c. of cyanide solution are taken each c.c. of the silver solution used indicates 1 pound of potassium cyanide to the ton (2000 pounds) of solution. Abroad, deci-normal silver nitrate solution is generally employed, the loss in cyanide being obtained in percentage on the ore. This percentage multiplied by 20 gives the pounds of potassium cyanide consumed per ton.

Another method which answers all purposes, provided the cyanide solutions are quite pure, but which is useless for complex mill solutions, depends upon the following reaction :

$$KCN + 2I = KI + ICN.$$

This method requires a solution of pure iodine in potassium iodide. A solution of pure wheat starch is used as an indicator. Ten or more c c. of the cyanide solution are measured off and run into a beaker. A few drops of the starch solution are added, and then the iodine solution is run in from a burette, with stirring, until an excess of one drop of the iodine solution is present, which is indicated by the formation of blue iodide of starch. The iodine solution may be standardized by some freshly prepared stock solution, or, preferably, by means of a standard solution of sodium hyposulphite. This method may be used to determine the percentage of KCN in commercial potassium cyanide.

(To be Continued.)

Africa's Condition.

The British investing public have a way of carefully looking after their holdings in companies, and at the meetings of shareholders they insist upon specific and reliable information from the directors. They do these things much better in England than in this country, where too often the shareholders are put off with glittering generalities. As a result, the stock markets are very sensitive to the reports published.

South African shares are a good example of this. The effect of the report of the Consolidated Gold Fields, Limited, has been a fall in the price of shares. This was probably due largely to a want of confidence in the claims made in the report as to the deep levels.

The London *Statist* a short time ago tabulated the capital values of ninety-six Transvaal mining companies, contrasting the present position of each company with that which it held about a year ago. On October 1, 1895, the aggregate capital value was £139,663,441; the prices at mid-October settlement this year represented a total value of only £78,706,480, showing a depreciation of £60,958,961, or 43 per cent. The biggest loss is in Rand mines—£6,321,452. Next comes East Rand, accounting for a difference of £5,037,694. Then follow Buffelsdoorn estates with £3,643,750 depreciation and Ranfontein with £3,500,000. Out of the ninety-six companies, only four show an appreciation, which is duly allowed for in arriving at the net result. Of these four, only one (Bonanza) represents a substantial amount, the increased value being £162,500.

The illiberal policy of the Transvaal Government probably has had much to do with this, but the main reason seems to be an uncertainty as to the future of the deep levels. Upon this point Dr. George F. Becker of the United States Geological Survey, in his report to the Consolidated Gold Fields, Limited, says : "It is very improbable that the ore of the deep mines in the region through which the Main Reef has been traced with certainty will show any general tendency to impoverishment ; dikes and faults will probably give less trouble in the deep mines than in the outcrop mines ; there is no ground for fearing unmanageable quantities of water, or even very serious pumping expenses ; and the temperature will increase more slowly than in most regions. There are, in my opinion, no insuperable natural obstacles to mining on the Witwatersrand at a depth of 4000 feet, and no known reason why, under favorable industrial conditions, the expense should exceed the present cost at 500 feet."

However, the principal feature about it all in the mining world is the fact that British investors are now looking more and more to other quarters of the globe for mining investments.

All this will do much toward keeping back the development of Rhodesia, where the value of the mines has not yet been proved. At an extraordinary meeting lately in London of the British South Africa Company, called to increase the capital by £1,000,000, the chairman said:

"When the board of directors issued their circular to you on February 10th last, explaining why it was expedient to defer holding the ordinary general meeting, there was nothing in the condition of affairs in Rhodesia leading us to anticipate the disasters we have since experienced and which forced us to make a new debenture issue and now necessitates our coming to you for a resolution increasing the capital of the company. The copious reports that have been published through journalistic enterprise during the current year have made you fully familiar with the matters mentioned in the circular accompanying the notice convening this meeting. I refer to the native rebellion in Rhodesia, and to the outbreak of rinderpest. The exceptionally heavy expenses thrown upon the company have exhausted the half a million cash which was on hand last February and the whole of the debenture moneys—a million and a quarter—raised in July last. The injury resulting from the cattle disease has been far-reaching. In the absence of a complete railway system, the usual mode of transport is by ox wagon. This the plague has stopped, preventing the usual flow of provisions into the country, and, as a consequence, we have been compelled to make arrangements in Rhodesia at great expense for provisioning the country during the coming rainy season, to assist both the settlers and natives. This has been successfully accomplished, and you will learn with satisfaction that there is no prospect of any renewal of such hardships as were experienced in the season of 1891–1892. The rebellion is practically over and the Imperial troops are leaving the country, the military experts considering that 200 hussars and 600 police are sufficient for the proper protection of life and property in Matabeleland. From the best calculations and estimates Lord Grey, our administrator in Rhodesia, can make, we believe the million we now propose to raise by the issue of 500,000 shares at £2, will meet whatever further exceptional outlay is necessary and carry us on until the end of September, 1897. If our anticipations are borne out, the ever-increasing revenue of the country ought next year to meet ordinary expenditure. Our advices from Buluwayo as to the prospects of the company are encouraging."

Mechanical Progress.

Gun Metal and Bronzes.

Gun metal, or ordinary bronze, is an alloy of copper and tin, with a slight percentage of zinc added to facilitate casting. The amount of tin varies from 8 per cent in soft gun metal to 20 per cent in the hard varieties, and the zinc should not exceed 5 per cent, being generally less.

This mixture forms excellent castings, sound and reliable, especially when rapidly cooled, which may be done by using iron molds. It is very largely used in naval work for valves, valve boxes, bends, propellers, stern tubes and underwater castings generally, and occasionally for the shells and doors of condensers. The alloy is also most suitable for the bushes of journals, the harder qualities being adopted for this purpose. For underwater fittings (except propellers) about 6 per cent of tin is sufficient; but castings subject to high steam pressures should have from 10 to 12 per cent, and for bushes having no white metal wearing surface from 15 to 20 per cent of tin is used.

Gun metal does not roll or forge, and is not suitable for rods or fastenings which are liable to tension. Being much stronger than cast iron and more reliably cast, its adoption instead of the latter saves a considerable amount of weight, but it is too expensive for use in the merchant service, where cast iron will serve. Steel castings are now being adopted in place of gun metal, where great strength and stiffness, combined with lightness, are required, such as for the large fittings of the main steam pipes of high-powered naval work. This alloy is more easily cast into thin castings of good size than brass, because the molten lead flows better, and it is therefore more suitable for condensers, but also more expensive. The contraction in cooling is about ⅛-inch in 10 inches. Gun metal is seriously impaired in strength by heat, the tensile strength at 500° F. being less than two-thirds that at atmospheric temperature, which ranges from 14 to 17 tons per square inch, the strongest quality being that containing from 8 to 10 per cent of tin. The elastic limit is low, ranging from three to five tons in tension. The weight of a cubic inch is 0.31 of a pound.

Phosphor Bronze.—The addition of a very slight quantity of phosphorus to the other constituents of bronze produces great changes in the qualities, materially increasing the strength and ductility. A good alloy is produced by the combination of from 0.2 to 0.3 per cent of phosphorus with a mixture of copper and tin in the proportion of 9 to 1, but the amount of phosphorus varies in different qualities from 0.03 to 0.8 per cent. In manufacturing, phosphor tin, containing a definite known amount of phosphorus, is added to copper—a process which gives a fairly good control over the composition of the resulting alloy even when the final percentage of phosphorus is very minute.

Phosphor bronze can be rolled into sheets and forged into bars, and forgings of this material are very suitable for rods and fastenings not subject to heat where strength and non-corrosive qualities are required. In sheet form the alloy is sometimes used for air-pump valves. It is largely adopted in naval work for rams and stern frames, also for propellers. Phosphor bronze is suitable for bearings, pump-water cylinders, and for piston rings, especially when working in steel barrels. It is not suitable for castings subject to heat, being liable to crack when hot, and the strength is reduced when heated even to a greater extent than with the other copper alloys. The tensile strength of cast phosphor bronze is from 17 to 22 tons per square inch and that of forgings from 25 to 30 tons, the elastic limit being about 45 per cent of the ultimate strength. Being hard and tough, this alloy resists compression well and will stand a great change of form without cracking.

Manganese bronze differs from ordinary bronze in having a slight proportion of ferro-manganese in its composition, which greatly increases the strength and toughness. The amount of manganese varies from an almost imperceptible trace to as much as 5 per cent. There are five grades of this alloy made, all of which can be cast in sand except No. 1, for which chill molds are necessary. The best and strongest forgings are of No. 1 grade, No. 2 being adopted for important castings, such as propeller blades. Nos. 4 and 5 are used for journals, being the most suitable for anti-friction purposes. The shrinkage is rather greater than that of gun metal.

Forged manganese bronze is suitable where great strength combined with non-corrosive qualities are necessary, such as for high pressure steam valve spindles, stays, thrust rods, etc. Although weakened by heat because the initial strength is too high, this alloy, when forged, is more suitable for use under heat conditions than any of the other copper alloys, with the possible exception of aluminum bronze. It was in great favor a few years since for the propeller blades of high-speed vessels, because of the good surface, fine edges and thinness obtained, another benefit claimed being that the points were only bent and not broken when struck, and could be hammered into shape again. But the latter quality is a doubtful advantage, and a long experience has shown the necessity of making blades of this material as thick as those of cast steel, so as to provide sufficient stiffness; also the smooth surface gets gradually pitted when running, but not to such an extent as with cast-steel blades. As these considerations lessen the superiority of this material over others for blades, engineers are not now so inclined to incur the additional expense involved in its use.

The tensile strength of No. 2 quality, when cast in sand, is from 28 to 32 tons per square inch, with an elongation of 13 to 20 per cent in 5 inches, the elastic limit being from 15 to 18 tons. Rolled No. 1 quality has a tensile strength of 33 tons and an elastic limit of 22 tons, with an elongation of 25 per cent as delivered from the rolls. After cold-rolling, the ultimate strength is 40 tons, and the elastic limit 30 tons, with an elongation of 10 per cent.

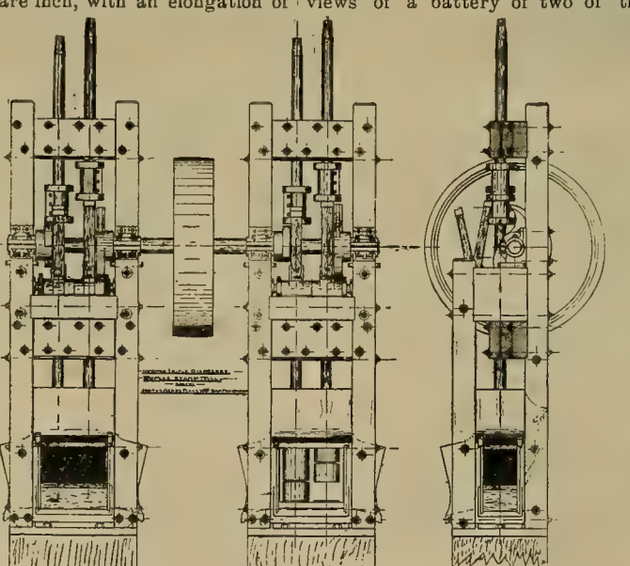
Aluminum bronze contains from 7 to 10 per cent of aluminum, alloyed with copper; also, traces of iron, silicon, phosphorus and other impurities, which, however, should be got rid of as far as practicable. These proportions of copper and aluminum have been found to give the best results as to strength, small cast bars having shown an ultimate tensile strength of 44 tons per square inch, with an elastic limit of 31 tons and an elongation of 10 per cent, still better results being obtained with rolled bars. This alloy shrinks and cools more rapidly than gun metal, being therefore more difficult to cast. It is the least corrodible of the copper alloys, and it is said to have the valuable quality of withstanding a high temperature without loss of strength. Being also somewhat lighter than the other bronzes, it promises to become the most important of the group, but at present practical experience of its use is very limited. The presence of a slight percentage of aluminum in any copper alloy improves its ability to resist corrosion, and the water pipes of some marine machinery are now being made of a mixture of copper and aluminum in the proportion of 99 to 1, and it seems probable that aluminum-bronze forgings will soon supersede forgings made of the other special bronzes.

White Metals.—There are various anti-friction metals of this class, Parson's and Babbitt's being good examples—the latter an alloy of 10 parts of tin, 1 of copper and 1 of antimony. When the surfaces work in water, Fenton's metal is very suitable, the composition being 8 parts zinc, 1.66 of tin and 0.34 of copper.

Another good white metal with ordinary lubrication has a composition of 85 per cent tin, 9 per cent antimony and 6 per cent copper. In some other successful anti-friction alloys lead is the chief constituent. Before pouring white metal into place, it is a good plan to tin the surface which contains it, which in any case must be quite clean and dry. White metal is used for the bearing surface in some types of piston rod packing, and in such cases care must be taken that the alloy has a fairly high melting point—say, not less than 700° F.

Triple Discharge Two-Stamp Gold Quartz Mill.

The engraving below illustrates a recently designed and improved form of a triple discharge two-stamp gold quartz mill, showing front and end views of a battery of two of these mills in combination, driven from one cam shaft and pulley. The novel features which have been introduced into the construction of this style of mill consist in the combination of a heavy stamp, given an unusually quick drop, and an extremely large area of screen discharge. The following is a general description of their construction and the principles involved in their operation:



Front Views. End View.

TRIPLE DISCHARGE TWO-STAMP GOLD QUARTZ MILL.

The mortars are cast with triple or three-way discharge openings, i. e., there are three discharge outlets, one in front and one in each of the two sides or ends, thus giving a screen discharge area of 465 square inches, which very closely approximates the discharge area of the best style of mortars used in five-stamp batteries, that area being usually 480 square inches, a difference of only 15 square inches between the two. The stamps weigh 850 pounds each, with a drop of 110 per minute through a mean space of 6 inches. The mortars are cast to weigh, cleaned, about 2800 pounds.

These mills were designed for use in the milling of ores extracted in prospecting and developing gold-bearing quartz mines, as the crushing capacity of all stamp mills is measurably governed by the character of the ores, and as it is generally the fact that the ores encountered in opening gold quartz mines are ordinarily easily disintegrated by stamping.

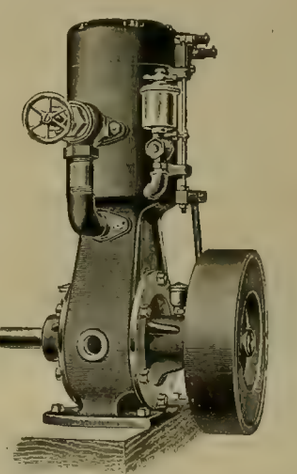
The crushing capacity of these mills is stated to be from six to ten tons of ore per day of twenty-four hours for each two stamps, or from three to five tons per day per stamp.

The power required to drive one of these mills is estimated at 6 H. P. as maximum. The weight, including battery frame, complete, is about 7500 pounds. The mortars—the heaviest part—can be cast in sections for mule-packing.

The Joshua Hendy Machine Works, 42 Fremont St., San Francisco, designed and builds these mills.

Simplex Naphtha Launch Engine.

This engine, made by C. P. Willard & Co., Chicago, is especially designed for marine work, and belongs to the class of vapor engines which receive an impulse at each revolution. The supply



of vapor to the engine cylinder is regulated by the use of an ordinary throttle valve in the same manner as a steam engine, and each charge is fired by an electric spark from a sealed battery. If high rotary speed is desired, these engines can be speeded up to 500 revolutions per minute.

Scientific Progress.

THE phenomena of rain are imitiated by Prof. Errera, of Brussels University, in a beaker. The glass, 8 inches tall by 5 in diameter, is half filled with 92 per cent alcohol, covered with a saucer and thoroughly heated over a water bath without boiling the liquid. It is then carefully removed to a wooden table. Soon the alcohol vapor is condensed into visible clouds by the cooling saucer, innumerable miniature droplets of rain fall and the clouds become gradually lowered away from the saucer. The miniature storm may last half an hour. The action is intensified if the warm saucer is replaced by a cold one. Whirlwinds and squalls are produced when the alcohol is very warm, and if the liquid is warmer on one side the clouds may be seen to rotate around a horizontal axis.

CONSIDERABLE more interest in the evolution of the horseless carriage is taken in Europe than in this country. This is probably largely due to the fact that the roads abroad are so much better than ours. Considerable money has been put into various devices, and no end of ingenuity engaged in improving or designing methods. Exhibitions of carriages have been numerous and popular, and large amounts of capital have been invested in experiments. James Long, in *Industries and Iron*,

speaking of them, says: "The adoption of electricity for the propulsion of the horseless carriage is as yet improbable. Thus far the thoughts of English engineers have been directed to the application either of petroleum or of steam. Whether in this particular field petroleum will displace steam, or steam will displace petroleum, is a matter which at present it is impossible to determine. There are some authorities who hold that steam will eventually prove the more effective and economical means of propulsion, whereas, if we inspect the motors now in existence, we find that petroleum is more generally used, because it enables the engineer to produce a lighter machine than is possible under present conditions with steam, and because the cost of running a petroleum motor is comparatively small."

ACCORDING to *Engineering*, some recent researches by Captain Abney show that the light of the starry sky is to that of the full moon about as 1:44,000. The latter is usually considered to be about as 1:600,000 to that of the sun at noon, so that we receive over 13,000,000 million times as much light as from the stars, taking both hemispheres into consideration.

THE value of the future depends entirely upon the value attached to to-day; there is no magic in the years to come; nothing can bloom in those fairer fields save that which is shown to-day.

Electrical Progress.

Electricity vs. Compressed Air.

Written for the MINING AND SCIENTIFIC PRESS by LEWIS SEARING, Denver, Col.

Last year the writer was called upon to investigate the compressed air system in operation at one of the largest coal mines of the Colorado Fuel and Iron Company, to ascertain the possible saving that could be made by substituting electricity. The result of the investigation showed such a great possibility for saving by the use of electricity that the Fuel Company decided to have a plant installed. The installation was made under the personal supervision of the writer and afterwards operated under his direction for over a month.

The above-mentioned mine (see page 437) is located at Rouse, Colorado, at an altitude of 6000 feet. The compressed air plant was employed only for pumping and comprises three compressors, each with 13½-inch H. P. air cylinder, 22-inch L. P. air and 20-inch steam cylinder, all of 24-inch stroke. The air cylinders are water-jacketed.

The air receiver stands outside of the compressor house and is 4 feet in diameter by 12 feet high, having no covering. The air is conducted down No. 1 mine by a 4-inch pipe to a duplex direct-acting pump, 18½-inch steam by 9½-inch water cylinder by 12-inch stroke, located near the face of the slope.

The order for the electric plant was given to the Denver Engineering Works Company, who were instructed to install sufficient power to operate, in addition to the regular pump, the ventilating fans, screens and shops about the mine, the selection of the machinery being left entirely to the engineers of the Denver Engineering Works. The plant as installed is described as follows: The power house is a substantial building of wood, covered with corrugated iron and completely sealed inside. It is large enough for two generating units and condensers and is equipped with a 6000 pounds capacity three-motion traveling crane.

One generating unit only was installed, it being the intention of the Fuel Company to install the second reserve unit as soon as the electric system should demonstrate its success. The engine is a vertical cross compound marine type. The cylinders are 11x19x15-inch stroke, developing 150 H. P. at 250 revolutions, non-condensing. The condenser is a surface condenser of the Admiralty type. The generator, mounted direct upon the shaft of the engine, has a capacity of 190 amperes and 550 volts. The generator, as well as all the motors, is a multipolar machine built by the General Electric Company. To insure absolute protection from lightning, which is very severe in this locality, all circuits are placed underground. The important circuits consist of iron-armored and lead cables, while the lighting circuits are made by running rubber-covered wire in iron pipes.

There are two small pumps used as sinking pumps, which are of the duplex type, having water ends, and driven through gearing by a 15 H. P. motor mounted on same frame. The cylinders are 7x10 inches and have a capacity of 250 gallons per minute against a head of 115 feet. The pumps are mounted on a four-wheel truck and can be moved around as desired. The station pumps, two in number, are double-acting duplex, with water ends, and cylinders 9½x12-inch, geared to a 110 H. P. motor. These pumps have each a capacity of 600 gallons per minute against a head of 400 feet.

The average of numerous tests on two small electric pumps gave the following results:

Average gallons per minute discharged	500
Average pressure at pumps	56.5
Average strokes per minute, each pump	172
Average amperes	37
Average station voltage	475
Average I. H. P. at engine	32.86
Average H. P. at pump discharge	16.4
EFFICIENCY.	
Generating unit, engine and dynamo	71.5%
Motor, pump and line	70.0%
Total from cylinder of engine to water discharge of pump	50.0%

As soon as the first station pump was started and in good running order tests were made with the following results:

Average gallons per minute discharged	650
Average pressure at pump	64
Average strokes per minute	188
Average amperes	53.5
Average station voltage	550
Average I. H. P. at engine	53.6
Average H. P. at pump discharge	24
EFFICIENCY.	
Generating unit, engine and dynamo	73.0%
Motor, pump and line	61.0%
Total from engine cylinder to pump discharge	44.5%

Although the total efficiency with the small pump is as high as predicted, it is, nevertheless, true that the engine and dynamo are working at a disadvantage, with a load of but 20% of their rated capacity. In the case of the large pump the generating unit is underloaded, as is also the pump, which combine to bring the total efficiency below the estimated 50%. When the mine is finally pumped out and all pumps and motors running the generator and engine will have a comfortable load, and it is safe to say that the total efficiency of the pumping plant will then be very close to 60%.

The fact remains, however, that at the efficiency above shown by the present working the former pumping of 400 gallons per minute against 120 pounds pressure, which equals 28 H. P., can be accomplished by the electric plant with but 56 H. P. at the surface, instead of 312, as before.

THERE is an interesting system of electric tramways being built in Genoa, Italy. There is no city in the world of the size built on such a steep sidehill as Genoa, and, to overcome the sharp gradients existing, several spiral tunnels have had to be pierced in the hillside, through which the electrical cars rise from one level to the other. The system inside the town will, when built, aggregate some thirty miles of track. Besides the town lines, lines are being built from Genoa to Nervi, Genoa to Voltri, and Genoa to Pontedecimo. The aggregate of these latter lines will be some forty miles, and alternating transformer substations will be used, somewhat similar to the system now running in Dublin.

RECENT developments in electricity have given a great stimulus to manufacturers of air compressing devices, and mutual aid and encouragement is resultant, says the Chicago *Journal of Commerce*. This co-operation is seen in most of the large railway yards of America, the electro-pneumatic switch involving a combination of the two elements. Compressed air in this device in yards around Chicago is now conveyed twenty miles along the road in each direction. Electricity handles the trigger, while compressed air is the power which does the work, a striking example of an instance where the latter comes in to the best advantage.

M. MOISSAN states in the Annales de Chimie et de Physique that the most stable compounds known to science disappear in the electric furnace. The only exceptions are the perfectly crystallized borides, silicides and carbides discovered by him. These, he thinks probable, are original constituents of the globe and must still exist in some of the stars.

Practical Information.

Briquettes from Culm Heaps.

Briquette making has become quite an industry in Germany, Austria and France, where the fuel question is much more important than it is in this country, and culm piles are being carefully utilized in those countries and made a profitable source of income.

Brown coal has so far been the chief material for briquettes, but in latter days, experiments with briquettes of solidified petroleum or residuum have been made which, however, did not result satisfactorily for the reason that the boilers were unable to withstand the intense heat developed by this kind of fuel.

L'Industrie describes a process devised by the chemist Velna who uses petroleum or mineral tar only for enriching culm and other inferior, formerly worthless combustibles, and produces briquettes from this material, the heating power of which is 30 per cent higher than that of good coal. He first prepares a mixture consisting of petroleum or bituminous shale tar, oleine and soda in suitable proportion, and by this means the culm, slack, or coal dust is cemented together. Three kinds of briquettes are produced in this way, namely, industrial briquettes for general firing purposes, gas briquettes for the manufacture of illuminating gas and metallurgical coke.

If culm or dust from a good coal valued at $1.20 would be taken for the production of briquettes, 6 per cent of the mixture would be sufficient. The price of a ton of briquettes would then be as follows:

1800 pounds of coal dust at $1.20 a ton	$1.25
120 pounds of the mixture at $12 a ton	.72
Cost of labor	.40
Total per ton	$2.25

If waste of a poorer coal be used, 10 per cent of the mixture would be the proper proportion. Supposing the waste, culm or slack, costs $1 a ton, the price of a ton of briquettes would be $2.50 under these circumstances. In the first case, there will be a saving of 25 per cent, in the second of 16 per cent. Considering further that the heating power of briquettes exceeds that of the average coal by at least 25 per cent, 1500 pounds of briquettes would be equal in heating value to a ton of coal. This would mean also a great saving of storeroom on board of steamers.

MORE than one-third of the entire population of the United States now live in cities. In some States it is much greater; in Massachusetts, 70 per cent; in New York, 60 per cent; in Connecticut, 54 per cent; in New Jersey, 52 per cent. In 1790 there were but six cities —i. e., having a population of more than 8000; in 1890 there were 448 such cities. In 1840 there were but three cities with more than 100,000 inhabitants; in 1890 there were 28 such cities. In 1870 there was no city having 1,000,000 inhabitants; in 1890 there were three such cities. In 1896 the new New York is estimated to contain 3,200,000, or nearly as many as the thirteen United States when George Washington took the oath of office as first President. This century came in without a single city in christendom with a million inhabitants. Paris had in 1800 but 548,000; London and its suburbs in 1801, 864,845. The other great English cities had less than 100,000. Great cities could not endure then. First, the people could not be fed on food produced within twenty miles of the place of consumption. Science has now made it possible to transport food half way around the globe and has discovered new methods of preservation as well.

Iron Bar 2000 Years Old.

S. T. Wellman has a portion of a round bar of iron—and a few like pieces are held in the United States—that antedates the Christian era by two or three centuries. The iron, which had been originally hammered into plates, and was deeply rusted from age, was found a few years ago by Dr. Karl Humann in the ruins of the temple of Artemus Leucophrine, at Magnesia, Asia Minor. Dr. Humann sent it to Hibauer, in Germany, and the latter made a portion of it a memorial tablet. This was presented to Bismarck in April, 1894. It bore this inscription in German:

"For you, Prince Bismarck, the Iron Chancellor, Hermogenes forged this iron at Magnesia, 200 B. C. Humann found it in the Temple of Artemus after 2000 years and sent it to Hallbauer, who gave it the form in which it shall bear witness that your deeds shall outlive millenia."

At the time of the presentation to Bismarck, Stahl & Eisen gave a photographic reproduction of the plate and an account of the discovery of the iron. The temple of Artemus, one of the most magnificent of ancient monuments, was rebuilt about 300 B. C., though by some the date is put at 200 B. C.

The metal is described as approximating steel in its composition, though closely akin to malleable iron. It was made at a low temperature and great care was necessary in the forging. It was found rather difficult to roll the pieces that were preserved as relics, these having a diameter of about one-half inch.

SPECIAL TREASURY AGENT AYER, in his report on the domestic tin industry, states that during the fiscal year ended June 30, 1896, the production in the United States of commercial tin and terne plates was 307,228,621 pounds, against 193,801,073 pounds produced during the previous fiscal year, showing thereby an increased production of more than 58 per cent. Of the production for the year, 303,002,098 pounds, or more than 98½ per cent, were made from sheets rolled in the United States, against about 83 per cent made from such sheets during the fiscal year ended June 30, 1895. The production of black plates in the United States during the fiscal year was 334,014,793, as against 148,443,319 for the previous year, showing an increased production of about 80 per cent.

THE Commission which has been inquiring into the proposal to unite New York and Philadelphia by means of a ship canal, has issued its report. Two surveys were made under the direction of the Commission. By either route vessels would use the Delaware river from Philadelphia to Bordentown. Thence a canal would be cut across New Jersey, entering the sea at Sandy Hook. The distance between the two cities would thus be reduced from 274 miles to 92 miles, of which 31½ miles would represent the canal.

LOCOMOTIVES destined for exceedingly fast runs require training, as do race horses. The locomotive built for speed is first put to work on some small branch line, with light trucks, until it becomes accustomed to running, and all the parts are brought down to their proper bearings. Having undergone this periodical probation, it is taken on to more important portions of the lines, and gradually worked up by increasing speed until it is given its place on the line of the great flyers. To train a locomotive takes about two months.

Coast Industrial Notes.

—The Southern Pacific will build a $5000 depot at Los Alamitos.

—The peat land celery crop near Anaheim, Cal., this year will be from 400 to 500 carloads.

—The United States engineers at San Francisco have advertised for bids for the construction of a gun battery at Ballast point, in San Diego harbor.

—The Pacific Coast Steamship Company's steamer San Benito was wrecked at Point Arena last Sunday and was a total loss. Eight of her crew were drowned.

—Seventeen carloads of English walnuts, worth $30,000, were shipped last week from Aliso station, near Tustin, and there remain three carloads more for export.

—Nearly all the cattle in Eastern Nevada have been purchased by Eastern buyers. They pay $25 for the tail ends of bands and $17 per head for cows and bulls.

—Ex-Judge James A. Waymire, who had contracted two years ago with the Board of Directors of the Turlock district to complete their irrigation system for the remaining bonds, some $400,000, has now offered to go on and carry out the contract.

—It is said that the effect of the Wright law decision may injuriously affect the $1,500,000 contract recently made by San Diego for a water system, as that contract is said to be involved in some way with the rights of the Jamacha irrigation district.

—Directors of the Pacific Mail Steamship Company have declared a dividend of 1 per cent cash, payable December 1st, the first dividend declared by the company for many years. The company is reported to have cash on hand amounting to $1,500,000. The directors have authorized C. P. Huntington to contract for an additional steamer.

—San Francisco exports of flour during the first ten months of 1896 were 966,667 barrels, against 760,567 barrels during the same period in 1895. Reducing this flour to a wheat basis and adding it to the exported wheat gives total exports of breadstuffs for the first ten months of 1896 of 12,428,000 ctls; valued at $13,745,000, against 11,028,300 ctls. at $10,337,000 for the same time in 1895. The quantity shipped this year is the largest since 1891.

—The Sierra Pacific Railway Company has incorporated in Amador county, Cal., for fifty years, its principal place of business San Francisco, to build a railroad from Stockton to Jackson, fifty miles, with a branch line of six miles to San Andreas, a branch line of two miles to Campo Seco, and one of two miles above Jenny Lind, in Calaveras county. The charter calls for the use of steam, electricity or other power for the road, but does not convey any idea as to its gauge.

—The population of Mexico in 1895 was 12,570,195, from which should be deducted 209,805 persons who are reported as "absent from the country." Most of them are in Texas, New Mexico, Arizona and Colorado, and other Western States. The number of foreigners living in Mexico is reported to be 246,985. Three-fourths of them are Americans employed upon the railroads and in the mines. There are over 5000 American citizens in Monterey and over 2500 in the federal district. This leaves the net native population 12,113,405, divided as follows:

Professional men, landed proprietors and capitalists	500,000
Federal, State and municipal officials, soldiers, etc	450,000
Engaged in mercantile pursuits	750,000
Employed upon railroads	350,000
Factory operatives	750,000
Artisans of various occupations	750,000
Employed upon farms	5,000,000
Employed in mines	2,250,000
Laborers in cities and various occupations	1,500,000
Wild Indians	200,000

Books Received.

Some Details as to Smelting Practice and Equipments for the Reduction of Gold, Silver, Lead and Copper Ores.—This is a valuable and timely publication, issued by The Colorado Iron Works. The proportion of ores that cannot be worked by ordinary milling is continually increasing, and the improvements of late in the methods of working rebellious ores have been very important. Two chapters of this work—"A Hot Blast System for Copper Matting and Silver-Lead Furnaces" and "Interior Contour of Blast Furnaces"—were published in the MINING AND SCIENTIFIC PRESS from advance sheets. Published by The Colorado Iron Works Co., Denver, Col.

The Story of the Mine, as Illustrated by the Great Comstock Lode of Nevada.—By Charles Howard Shinn. In this book—one of the Story of the West series—Mr. Shinn has given an interesting picture of Western mining. His story centers about the Comstock, the greatest of all mines. The miner of this part of the continent many have tried to sketch, but few have entered into the spirit of his life. Mr. Shinn is a Californian and knows his subject. He makes no attempt at a technical description of mining, yet the book cannot fail to interest every miner, and will be of value to many who know little of the industry that has made this region great. Published by D. Appleton & Co., New York; price $1.50.

A Textbook of Plane Surveying.—By William G. Raymond, C. E. This work is a manual for the study and practice of surveying that will be found to be of value. The particular advantages are the arrangement of the subjects and the clearness and simplicity with which all points are expressed. The author is professor of geodesy, road engineering and topographical drawing in the Rensselaer Polytechnic Institute and knows the value of making clear and accurate statements in mathematical subjects. A large number of original problems and illustrative examples is given, furnishing valuable material for practice. Published by the American Book Company, New York, Cincinnati and Chicago; price, $3.

Specifications of Mining and Milling Plants for Prospecting and Developing Gold Quartz Mines.—The Joshua Hendy Machine Works, 38 Fremont street, San Francisco, publish an interesting catalogue of the principal mining machinery of the latest designs that will be of interest to miners. Sent on application.

Personal.

E. A. RIX has returned from a visit to the Cœur d'Alenes.

E. A. WILTSEE has been in the Jacalitos district, in Lower California, examining some mining property.

W. H. HAMPTON, Wolf Creek, Or., has been re-elected president of the Southern Oregon Miners' Association.

CAPT. THOMAS MEIN has gone down to the Steeple Rock properties of the Exploration Company in New Mexico.

SENATOR JOHN P. JONES returned from Nevada and the East last week and has gone down to his home at Santa Monica.

JAMES D. HAGUE lately went to the Tomboy mine at Telluride, Colorado, for the Exploration Company who purchased the property a few days ago.

PROF. LINDGREN of the United States Geological Survey has been for two weeks in the southern part of Wyoming making a preliminary survey of the geological formation.

C. J. JOHNSTON, a California miner, is the latest to go to Johannesburg, at a salary of $20,000 per annum. He will have charge of the mines of the Knight Co., twelve miles from Johannesburg, South Africa.

IT IS understood that Hamilton Smith, who has been at the Anaconda copper properties, will, after making an examination of the Tom Boy at Telluride, come out to San Francisco, and will remain on the coast some time.

AGNES M. CANNON ran against her husband for State Senator in the 6th senatorial district of Utah, and beat him 4000 votes. Mrs. Molloy is elected as a presidental elector in Wyoming. Mrs. Amelia Lichau and Mrs. Mattie Cramer have been elected members of the California State Miners' Association. Each case mentioned is the first of its kind in ancient or modern history.

Obituary.

DR. G. H. C. BONTE, who has for many years been secretary of the Board of Regents of the University of California and professor of legal ethics, died at Sacramento last Tuesday, aged 65.

SPENCER C. BROWNE died suddenly of heart disease at his home in Oakland last Monday evening. The deceased was a son of the late J. Ross Browne, once United States Minister to China and a well-known authority and writer on mining matters. Spencer Browne has for about a year past been superintendent of the Oneida mine in Amador county. Ross E. Browne is a brother and Charles F. Hoffman a brother-in-law of the deceased. He leaves a widow and three children. The deceased was highly esteemed by all who knew him.

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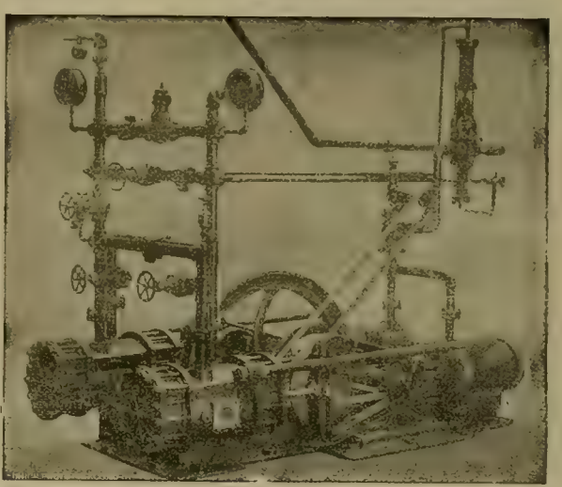

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Mining Summary.

CALIFORNIA.

Amador.

The Argonaut Mining Company will crush 500 tons of ore at the Zeile mill. The Argonaut shaft south drifts from the 1150, 1250 and 1350-foot levels show 20 feet wide of ribbon rock. Fifty men are employed.

At the Pocahontas mine in Drytown district the shaft is down 90 feet, and in the crosscut four ledges have already been encountered. The last one struck is 23 feet wide and prospects well.

At the Bay State mine in Plymouth district the 10-stamp is running regularly on good rock from the 700-level, where drifting and stoping is in progress. On the 300-level a crosscut is being run for the west ledge. It is in about 50 feet, and they expect to encounter the vein in about 300 feet.

Ledger: At the Union Consolidated at Weiland, B. Bibo, the superintendent has fifteen stamps dropping upon good pay ore from the gouge ledge at the 300 station. The other fifteen stamps of the mill will be started as soon as they are repaired. In addition to taking out ore, shifts of men are engaged in crosscutting south at the 400 from the west ledge to the gouge ledge, and drifting both east and west from the same level, and sinking the shaft from the 400 to the 500-foot level. Fifteen additional miners were put to work this week.

Angus Mackintosh of San Francisco, who, with others, purchased the Del Ray property, near Middle Bar, and prospected it, sold their interests to Captain Eads and others last week. The owners have ordered material for a whim and shaft, and will begin to sink on the property.

At the Bellweather mine the shaft is now down over 250 feet, and is being sunk at the rate of 52 feet a month. Enough material is on the ground to sink 500 feet. The shaft is in slate, and stringers of ore are struck as they go down.

Republican: At the Alma mine they are pushing the work of sinking the shaft to the depth of 1050 feet, with about 150 feet more to sink. When this is done the work of opening up the mine will be undertaken. The ledge will be tapped from three levels. To complete sinking will take until January, and to open up the levels will require three or four months.

At the Oneida the shaft has reached 500 feet, and sinking has been prosecuted without any drawback.

At the Argonaut they have met with a large body of ore, both north and south of the shaft. While it is thought to be rather low grade, little doubt is entertained that it will pay to mill. A test crushing of 500 or 1000 tons will soon be made at the Zeila mill.

At the Union Consolidated fifteen stamps are running day and night. Quite a number of new men were put on this week on account of starting in to sink to the 500. The station at the 400 is completed, and from this point they are drifting east and west, also crosscutting to the south to get into the gouge ledge.

Butte.

The Cherokee Flat hydraulic gold mines, with a record so far of producing $13,000,000, which has been tied up with litigation for ten years past between the Bank of California on one hand and the bondholders on the other, was last Saturday sold under foreclosure sale. The entire property, consisting of 1000 acres of auriferous channel, 100 miles of water ditches and thirty miles of channel for "debris," was bid in by a committee of bondholders for $275,000. The mines, until the commencement of litigation in 1886, were worked continuously for over thirty years, employing from 300 to 400 men. It is estimated that over half the gold-bearing channel still remains untouched, prospecting tunnels showing it to be as rich as that part already mined. For ten years the Bank of California and N. D. Rideout have contended against the bondholders to prevent foreclosure, which was finally granted a few months ago. During the past ten years the mine has not been abandoned, there being over 100 men in companies of from five to twenty-five men each working the least valuable part of the lead upon a royalty. Work upon the main channel has, however, been suspended. It is the intention of the bondholders, in the event of their not getting their price for the mine, to develop and operate it themselves. Several companies, are, however, examining the property.

Calaveras.

(Special Correspondence). — The Melones Mining Company is proceeding with the development of their mining property under the supervision of foreman Bert Del Ray. They have just completed a hoisting plant, 80-horse power boiler, double acting hoisting engine, gallows frame, engine house—all of a class that promises continuous work. The old shaft is over 400 feet deep. They will commence unwatering the mine at once and continue sinking the shaft, crosscutting as they go. They have secured nine acres of ground adjoining the river (Stanislaus) for a millsite. On the Carson Hill end of the property they are sinking a new shaft on the Reserve mine, and are now engaged in equipping this mine with a new and complete hoisting plant.

Everything is working satisfactorily at the Jones mine, belonging to the Carson Creek Mining Company since the introduction of their new compressor plant, which has a capacity for fourteen drills, and also furnishes air for the pumps. It was built here in the mountains, at the foundry of Demarest & Fullen, Altaville. The old mill has also been entirely rebuilt and remodeled, and a chlorination plant, with a daily capacity of ten tons of sulphurets has also been added. The shaft is being retimbered and enlarged, and when this is completed they will treat at the mill 130 tons of ore daily. The mine is making satisfactory returns. Much of the success here is due to the youngest partner in the concern, Mr. Cohen, and to Mr. Naylor Williams, his superintendent.

The Santa Anna mine continues sinking its shaft. It has passed the 300 level, where a crosscut to the vein developed 12 feet of ore. The shaft will be continued to a depth of 600 feet, with crosscuts run to cut the vein at every hundred feet. The plant here, for a small one, is very complete, and excellent work is being done sinking and drifting.

Fred Bruner is pumping out the water of his Bald Hill mine to show it to some intending purchasers.

At his Pure Quill mine they have just made a trial test of thirty tons of ore. It went $5 free gold and suphurets so rich that I hesitate to report the value until the returns come from Selby's.

Work on Charles Trayon's mine is progressing favorably. They are down 160 feet, have cut the Utica vein, and with assays as high $120 a ton, have no use to worry about the future.

On the Ghost mine, belonging to the same owners, their shaft is down over 200 feet, and being pushed right along. I am afraid they are too far east here.

The Blair mine has started up with good backing. They have a good property, and just in their immediate neighborhood there are as good prospects as can be found in the State.

If the California Exploration Company do bring electric power to this part of the county, and will furnish it strictly at a fair cost to the mine-owners, you will see in the near future some of the best mines on the mother load developed near Altaville.

Mercer & Son have started work on their mine. It is showing well. Of course, the Utica is doing well—just the same all the time. It is hard to get a bed these nights at the hotels in Angels, for men hunting for mines are the principal patrons. Angels Camp has been under a cloud for some years as a mining center. The change for the better now taking place is very apparent. It will not be very long before I can chronicle news of a strike, or strikes, which will prove to the doubting Thomases that there is more than one Utica on the lode between Angels Camp and the Stanislaus.

Angels, Cal., Nov. 24th, '96.

Chronicle: The Hexter tunnel is now in 1030 feet.

The California Exploration Company has ten tons of track iron, two large ore cars and four carloads of redwood poles for electric light and power at Valley Spring. The track iron and ore cars will be used in running the new tunnel at the Gottschalk mine.

At El Encino mine last week 150 tons of gravel, principally taken from the bench on the north drift, was put through the mill, and it paid well.

The Quartz Glen Mining Company, recently incorporated, will work the mine of the same name, located a short distance from Rich Gulch and known as the Foote & Thompson. The lower or south tunnel has been driven into the mountain about 250 feet, and an upraise has been made from the upper tunnel something over 100 feet to connect with the old workings made by the first owners, Foote & Thompson. There is a 20-stamp mill on the ground, part of which has been kept running days to prospect the ore from different parts of the mine, of which there is a large amount in sight.

Work on the Golden Hill mine, which adjoins the Spring Gulch, has been commenced by the California Exploration Company.

Angels Voice: The Stickle shaft of the Utica will be closed shortly for repairs, as the large amount of rock taken out close to the shaft has made too much pressure for the timbering. A new shaft will be sunk to connect with the winze on the 1000-foot level. This is thought by outsiders to be a favorable indication of the mineral wealth still uncovered, as the cost of such a shaft is not considered to be less than $30 a foot, or $30,000.

Prospect: The Sheffield mine, owned by Porteous brothers, has been bonded by Col. Robinson, who has put up a 3-stamp mill and hoisting works.

The Congdon brothers have built a 3-stamp mill on their mine on the south fork of the Mokelumne river. The character of the rock is a sandy lava, milling about $3 to the ton, and the vein is about 20 feet in width. The whole mountain through which this ledge passes is of a lava formation, but the vein, although partaking of the nature of the country rock, is well defined and can be clearly traced through the entire mountain.

At the Blue Bell mine, owned by the Lloyd brothers, near the source of the Mokelumne ditch, a 4-stamp mill has been put up and the stamps began dropping on rock last week.

The Mitchell mine, near Railroad Flat, is running with about thirty men, and the 10-stamp mill which is being built will be ready to crush in a few days. Hoisting works have been erected and a tunnel is being run along the vein. It is the proposition, however, to sink a shaft at the mouth of this tunnel to a depth of 1000 feet. The ledge is about 3 feet wide, showing free gold and carrying a large percentage of sulphurets.

The Petticoat mine, near Railroad Flat, is being reopened under the management of W. H. Clay, Jr. The old shaft, which is 400 feet deep, has been cleaned out and retimbered down to water. A 70 H. P. engine and boiler are now being put in place. This mine was worked in early days and was very rich, but, like all tellurium rock mines, when the water level was reached the ore required a process of reduction which was not at that time known.

At the North Extension of the Mitchell mine, owned by O. Lampson, a shaft 20 feet in depth has been sunk, showing a lead 1 foot in width, with rock that will mill about $40 to the ton. The vein gives indications of widening in depth.

The Ponge or Swiss mine, in Blue Mountain district, has been taken hold of by a San Francisco company. A contract has been let to run 150 feet of a tunnel.

The Soap Root mine, near West Point, which was worked for about a year by an English company, has closed down.

Citizen: The shaft at the Gwin mine is now down 1412 feet. The rock in the bottom is very hard and slow progress is being made. The station timbers for the 1400-level are in place, and after the sump is completed the station will be cut and a crosscut run to the ore body, about 65 feet east of the shaft. The 1200 and 1300-foot levels are in good shape to commence taking out ore. The frame work for a 12x16 crusher is being put up, and will be at work in a week or two, when at least 100 men will be employed.

El Dorado.

D. H. Jackson has bought a half interest in the Lone Star mine. He had a two years bond on the property which had not quite expired and has been pushing the work on the mine ever since last March.

The new mill on the Blanchard mine has started.

Kern.

Californian: A new steel whim, cars and skips have been recently put in at the Olympus mine, Randsburg, to expedite the handling of ore.

A Cripple Creek mining man has purchased the 4-stamp mill at Garlock. It is said that he will at once enlarge it to a 10-stamp mill and add concentrators.

A Los Angeles company has taken a working bond on George Barton's mine at Randsburg and will push development on the property at once.

Mariposa.

In a circular to the stockholders of the Merced Gold Mining Company the directors say: "In our development work on the Mary Harrison location we have opened up a body of ore about 300 feet in length at the 400-foot level. The extent of this body in depth we know nothing about as yet. A mill test has been made, and the following telegram has just been received from the mine: 'Mill returns show from the Mary Harrison 139 tons of ore treated, the yield being $1039 gold, and one ton sulphurets, having assay value of $94.05. This shows a yield of about $8 per ton of rock treated.'"

Miner: The resignation of Captain Thomas Couch as manager of the Merced Gold Mining Company has been accepted. John R. Gilbert has been appointed as manager of the Merced Company here, and has returned to Coulterville to assume charge. Captain Couch accompanied Mr. Gilbert and will remain for several days. The Captain is a heavy stockholder in the Merced Company, and will remain as one of the directors. He will leave for Mexico shortly to assume charge of mines being operated there by an English syndicate.

E. C. Loftus has bonded the Jeffrey mine and the Ruby, an extension of the Jeffrey. These claims are south of the Mary Harrison.

Colonel Haskell has his new 5-stamp mill on the Little Wonder about completed. The Little Wonder was bonded from Mr. Raggio of Big Oak Flat.

The Never Sweat mine, owned by Ballentine, Rucker & Fisher, is showing up some good ore. Sinking in the old shaft has been resumed, and the ledge matter shows considerable free gold.

Nevada.

Union: A cleanup for ten day's run with a 5-stamp mill at the Pennsylvania mine amounted to $4500 and it is expected that the month's yield will be $12,000. The monthly expenses are $1500. Last month the total yield was about $8000, from 200 tons of ore. The company had $6000 in its treasury before the last cleanup.

At the Brunswick a rich ledge has been found on the 900-foot level. Its size has not yet been determined, but it is at least 3 feet wide.

After long years of idleness the Kentuck mine is now destined to be worked. The machinery has been ordered and in a short time it will be placed on the ground. L. P. Goldstone is managing the affair and Jabez Howes is president of the company. The Kentuck is north of the Idaho mine and has long been regarded as one of the best places in this district to spend money on with the view of developing a valuable property.

Placer.

Colfax *Sentinel*: Owing to the death of Mr. Borland, one of the owners, the Sacramento gravel mine on the Forest Hill divide will be sold. The claim comprises 144 acres. The tunnel has been run 1500 feet.

The eighth installment of the Blue Canyon Mining and Development Co. has all been paid, and installment No. 9 has been called for.

The 20-stamp mill at the Mayflower gravel mine, near Forest Hill, is running steadily.

A new six-ton boiler and furnace has arrived at Colfax for the Pioneer Mining Co.

The company which owns the Emanuel Polifka ledge above Westville has finished hauling in forty-two tons of machinery and supplies. They will try to build a sawmill yet this winter.

The big tunnel of the Eureka drift gravel mine, Forest Hill divide, is in 1740 feet. For the last 350 feet the tunnel is principally in quartz. The company is cutting across an enormous vein.

Shasta.

Searchlight: The Mountain Mines, Limited, are now employing between 500 and 600 men. The second smelter of the water jacket pattern will be ready to start up in a few days. The first smelter, which has a capacity of over 150 tons a day, had fires drawn Sunday for the first time since it started up, the beginning of September. These smelters are a success in every way and the ore is being treated in an economical manner. Before the beginning of the new year they will be in operation and four more will follow immediately, making a total output of not less than 1200 tons a day. The company is having constructed a large number of cottages for the men employed who have families. The new hospital building will soon be under way.

Rich ore has been struck in the Little Susie mine, situated four miles from Shasta, on the Weaverville road. The width of the vein averages 4 feet.

The Hard Scrabble gravel mine, southeast of Igo, has been sold to a Chinese company of San Francisco.

Mining interests in Lower Springs are perceptibly stimulated of late and development work is being actively prosecuted on many prominent ledges.

A party of men have secured a lease on the Gypsy mine, on Salt creek, and will commence to take out ore in a few days.

E. P. Conner is developing some properties on Salt creek.

W. Ikard will commence work on his placer claim when rain sets in.

The owners of the Last Chance mine have finished a 600-foot tunnel which was run to tap the chute of ore, and are getting out some good rock.

Work will be commenced on the Old White Oak mine in a few days. This property has quite a record as a bullion producer, but has been idle for a long time on account of the death of owners.

Sierra.

Marysville *Appeal*: The manager of the Alaska mine has gone to Scotland, whence he is expected fo return soon with the necessary funds to construct a tunnel into the ledge from Oregon creek, thus obviating the trouble with water that the mine has experienced in the past.

Mountain Messenger: The Gold Bluff mine is now in the hands of C. D. Lane and Alvinza Hayward, W. V. Lockwood having bonded it for them. Mr. Lockwood has taken charge of the property, and will first put the electric plant in working order, preparatory to pumping out the shaft.

For some time past Mr. Costa has had a number of men employed at the mine in the works above the shaft extracting ore, which is now being delivered at the mill. The mill, in charge of Emil Loeffler, will be started running this week, when all the ore now on hand will be crushed.

The South Fork Company have struck the shaft in the old Live Yankee mine.

The North Fork Company is expecting any day to tap the incline of the Uncle Sam mine.

The gravel struck at the Lucky Dog mine is reported to prospect well.

Siskiyou.

Yreka *Journal*: Over on the Salmon the miners in river claims were driven out by the high water, the river being nearly as high as at any time last winter.

The Gold Run mine owners have struck the ledge in their new tunnel, now driven in about 1100 feet, and it is very rich.

The Black Bear is still running on good ore. They recently struck another rich body of good quartz.

The Gold Ball mine is still shut down, and, from all indications, will not start up very soon.

Wm. Burns will soon put on a full force of men to rig up his claim.

Smith & Hamilton are preparing their mine for the winter run.

The Erno 5-stamp quartz mill has been completed and will soon be put in operation.

Dr. Simon of Redding has been making arrangements for starting up the Nannetta B. mine on Thompson creek. This is the old Ben Shinar mine, which was purchased some time ago by Leadville, Col., capitalists.

At the Schroeder mine, on Deadwood, they are running a tunnel which will tap the ledge at a depth of 1000 feet.

The rains of the past two weeks have furnished plenty of water for the smaller placer claims, which have been started up.

News: The affairs of the Ball mine, which have been tangled up in litigation for some time past, are about to be amicably settled. Mr. Ball has reached an agreement with the Eastern stockholders whereby he will pay all liens against the mine, amounting to about $14,000, after which he will have full control of the property and will resume work on a large scale.

Dannenbrink Bros. of Hungry Hill are running a lower tunnel in the Gold Run mine, which is now in 1100 feet and will be pushed about 900 feet farther. They have tapped a 2-foot ledge 300 feet below the present workings where the ledge is not so wide, showing that the body of ore is greater as depth is attained.

Biglow brothers have had a successful season working their claim eight miles below Sawyers bar.

Colstein & Thrash are working a ledge on Humbug which averages 16 inches in width and yields ore milling about $12 per ton.

Harris brothers have started up their mine fourteen miles below Sawyers bar.

Trinity.

Journal: On the Stuart Fork side of the La Grange Company's tunnel twenty-five men are employed, but slow progress is being made at present, owing to the hard rock which has been encountered. It will probably take twelve months or more to complete it. Almost three miles of flume have been built. The flume when completed will be nearly eleven miles in length, to which will be added a mile of pipe line. The tunnel when finished will be nearly two miles in length.

On the East Fork the placer mines are getting ready for the winter.

The Golden Chest mine, which has been idle for several years, is now being worked.

Skinner & Barkla of the Yellowstone mine have a big ledge of good milling rock, and will soon start up their 10-stamp mill again.

Thomas Nicholson and Philip Kleckner, who

recently leased the Poor Man mine, are taking out ore, and will soon have a good crushing ready for the mill.

Journal: James Mayberry, superintendent of the North Star mine, has a big ledge of good rock opened up in shape to work, and is keeping the 10-stamp mill running steadily with a small crew of men.

At the Enterprise the ledge, especially in the Lone Jack location, is looking better than ever before. The company are now working a winze on the ledge in their 250-foot tunnel, and the water is being drawn out with a syphon. The ledge shows free gold, and is getting bigger as it goes down.

Tuolumne.

Independent: It is reported that the Experimental mine, owned by Engelke & Co., will be opened up shortly by a San Francisco company.

The new chlorination works at the Star mine are proving satisfactory.

At the Golden Gate mine the mill has been started up again.

The mill has been started up again at the Belleview mine, after being closed down for a month. The new pump is in and is the largest in the county.

The new hoist at the Soulsby mine is at work and will be fully under cover within three weeks.

Yuba.

Marysville *Democrat*: Men have gone to Dobbins ranch, Yuba county, to erect a hoisting works on the Eagle mine, which adjoins the Good Title, and is under bond to the Good Title Company. It has been worked for some time in a small way, and the new company contemplate extensive operations. There is a 7-foot ledge in sight, and it looks well. The company hope to have their new works completed and the pump running by January 1st.

NEVADA.

Reno *Gazette*: Joe Farren, who is representing a strong English syndicate, has arrived at Golconda with ten miners to go to work on the Adelaide copper mine, ten miles south of Golconda. The Adelaide is a fine copper prospect, and the Englishmen intend, if the mine proves as rich as they think it will, to put up large concentrators at Golconda and work 500 or 600 men. Mr. Farren will put on a force of about twenty-five men next week to do the prospecting. He is also operating at Cherry creek, White Pine county, on the Star and Grey Eagle, for the same company. He is working about twenty men in White Pine.

White Pine *News*: Will Bliss of Carson has been making an examination of the Chainman mine for San Francisco parties.

The mill of the North Mountain Company at Cherry Creek is running regularly on ore with the cyanide process. Recent reports are to the effect that the cyanide is saving all the gold and 70 per cent of the silver.

NYE COUNTY.

W. H. Bray, one of the owners of the Ione Gold Mining Co., says that the new gold mill recently erected by the company near Austin is a success, and that the amount of bullion saved from the ore was gratifying, 92 per cent being saved on the plates and 6 per cent being in the concentrates. The mill is being run under the management of E. W. Brownell. The mine is looking well, with high-grade gold ore in sight. The mining property now being handled by this company has laid idle for years. Eight months ago W. H. Bray saw that it was valuable, formed a company, and by able management the promoters have insured the enterprise a paying affair from the start.

OREGON.

BAKER COUNTY.

At the White Swan a 12-foot vein of ore has been uncovered in the 400-foot level and the mill will soon be started up again.

Eight men are at work on the big placer mines near Woodley, making preparations on a more extended scale than ever for next season's work. The main supply ditch has been increased nearly one-third in size, and an additional pipe will be put in operation on Carson hill. Another pipe will also be worked in Tanner gulch.

W. J. Clark has disposed of his interest in the Union-Companion mines, which are now entirely owned in New York.

JACKSON COUNTY.

J. W. Robinson of Wimer has commenced work on his placer mines in Brass Nail gulch with a large force of men.

The lost channel of Humbug creek was struck in John Bolt's placer mine last week and $13.11 was washed out of the two wheelbarrow loads of dirt from the drift.

Allen Lewis has a large force of men engaged at the mines on Grave creek, formerly owned by the Taylor Mining and Milling Company, extending the ditch and putting in new pipe.

JOSEPHINE COUNTY.

A rich strike is reported to have been made in the Renshaw Consolidated mine. An assay is said to have been made which shows $83 per ton in gold.

George Dorwin has five men at work on the Jewett mine. Some large bodies of ore have been exposed.

The Griffin Mining Company of Sardine creek is having milled some ore which nets about $40 per ton. The ledge is about 3 feet wide.

William Edwards, a mining expert from London, England, and Benjamin Bullard, formerly superintendent of the Squaw Lake Mining Company, have been inspecting the Denver City ledge.

WASHINGTON.

Spokane *Chronicle*: The Golden Triangle Gold Mining Company has been organized to work the Golden Triangle mineral claim in the Twisp district, Okanogan county. The claim has large bodies of very rich ore, some of the assays running as high as $600 per ton in gold and copper.

The Red Shirt mine has a 20-stamp mill in operation and the company have expended fully $75,000 in machinery and development work during the past summer.

BRITISH COLUMBIA.

Spokesman-Review: The British Canadian Gold Fields Co. has let contracts for considerable development on their properties on the north fork of Salmon river.

The Slocan Star has at present on its payroll 130 men, 70 of whom are employed in the mine.

At the Noble Five the owners expect to take 100 tons of ore daily.

The output from the Rossland mines during October was the largest in the history of the camp. The amount sent to the smelter aggregates 5037 tons, divided as follows: Le Roi, 3400 tons; War Eagle, 1240; Evening Star, 27; Poorman, 120; Josie, 225; miscellaneous, 25. It is expected that with the machinery now installed and additions being made at some of the mines the production will be enormously increased during the coming year. The Le Roi alone, it is said, with the additional machinery will produce 500 tons a day. The War Eagle will add to its production, and the Josie will be in a position to materially increase its output. There are twelve or fifteen mines which are employing machinery in development.

Spokane *Chronicle*: At Grand Forks three mines, the Bonita, Grand Forks and Grey Eagle, have started active operations.

At Ainsworth the Little Phil mine is under bond to N. Clark Wallace of Toronto.

CANADA.

Toronto *World*: In the Lake of the Woods district the principal vein in the Scramble has been traced 1500 feet. The mine was purchased as a prospect for $7000. A shaft and crosscut show 38 feet of $15 ore.

The Mikado mine was purchased some time ago by Col. Ingleduce for $25,000. There are at work twenty three men. A lot of 140 tons worked yielded $8000.

The Yum Yum, adjoining the Mikado, was lately sold for $25,000 to an Ottawa syndicate.

On the Sultana the shaft is now down 330 feet, and ore is being taken from the third and fourth levels. The vein varies from 35 to 50 feet in width. Fifty men are employed, and a 10-stamp mill is running regularly. The value of the output is about $10,000 a month.

On the Regina the shaft is down 200 feet. A 10-stamp mill has been running 13 months. A cyanide plant is being put in.

UTAH.

Bingham *Bulletin*: Quite an increase in ore movements is noticeable. Among shippers are several of the Niagara Company's mines, including the Live Pine (two leases), Utah and Indiana; also the Northern Chief, 100 tons, and a lot from one of the Turngren group. During four days the shipments from the Old Telegraph averaged about eighty tons per day.

Superintendent Gebhardt reports the outlook at the Phœnix group is of a satisfactory nature, and there is no doubt that the strike lately made in the Coramandel mine is important. The 600 tunnel from the Carr fork side, through which the group will be ultimately worked and which has been run 1400 feet, is expected to tap the main vein in another 200 feet.

Monroe Salisbury has transferred his interest in the Mayflower to Chicago parties.

Park *Record*: The Vallejo has a 7-foot breast of ore that will yield over $100 per ton. An average sample taken across the breast yielded the following results: Silver, 8 ounces; copper, 16 per cent; gold, 3.8 ounces; value of gold, $63.85.

The Ontario Company has gone below the drain tunnel and found over 20 inches of ore showing 150 ounces in silver and 25 per cent lead. The vein, at the point where the ore was encountered, carries all the marks of being permanent, and Mr. Kervin is satisfied that he has demonstrated beyond a doubt that the Ontario is greater still. The winze is now down over 90 feet and the ore increases in width with depth.

Salt Lake *Tribune*: F. F. Frisbie and associates have acquired control of the Zelnora mine at Bingham. The purchasers will at once begin active development work.

Thomas Lloyd, the State Mining Inspector, says that while a large number of properties have suspended the production of ores, owing to the price of the metal market, a number of new ones have started up and there are probably as many men afforded employment as at the corresponding period last year. At Bingham the decline in lead has worked serious loss to the shippers, while the same thing has occurred at Park City. In the camps of Tintic the gain in the percentage of gold that has continued to increase as depth has been attained, has made it possible for the older mines to continue their output, and that it does exist in such abundance has inspired the development of much new ground. He predicts an increased amount of work in all the mining camps during the next few months, and more especially in those where the gold ores predominate.

The property of the Shoebridge Bonanza is to be systematically developed under the direction of Mr. George H. Robinson, who has done so much to disclose the riches of Tintic. It is the result of a deal in which Mr. Robinson and his friends acquire a half interest in the property.

At Mammoth the bids received for sinking another 100 feet on the Apex shaft have been opened and the contract let.

At Mercur the strikes in La Cigale and Omaha have caused great excitement, for they open to the miner and prospector a new area of mineral territory larger than the whole gold district of the Rand, South Africa, and a larger area than has already been developed from the Sunshine on the south to the Northern Light on the north.

The strike in La Cigale was made in the shaft at a depth of 50 feet, and assays from $1 50 to $17 were obtained; averages of 9 feet gave from $7 to $10, while averages of certain parts of the vein run much higher.

A large amount of cinnabar ore is being encountered in the west drift of the Gold Dust. This ore is always high grade, and is regarded as an indication of the continuity and permanence of the vein.

Judge Harris, representing Eastern people, has secured a thirty-days' bond on the Potomic, Chesapeake, Arctic, Rappahannock, Delaware and Green Mountain claims, in the vicinity of Lion hill, for $25,000.

Col. O. B. Hardy is arranging for driving a tunnel into the properties of the Bingham Copper Company, and to tap the vein will be compelled to go a distance of 1900 feet. The tunnel will tap a number of properties, and will afford an economical outlet for everything upon its line.

The Sioux-Ajax tunnel has now penetrated the ore zone for a distance of nearly 1400 feet, and predictions are made that ore will be encountered within the next thirty days.

MONTANA.

Inter-Mountain: Work has been resumed at the Hope mine at Bison for the first time since the fire, when several men lost their lives by asphyxiation. The mine is owned by Philadelphians. A force of men is now at work erecting a concentrator, which will have a capacity of treating 250 tons of ore a day.

The Boston News Bureau says: "It is said that Messrs. Lawson, Weidenfeldt & Co. have secured an option at $5 per share on the 90,000 shares of Butte & Boston stock held by the Davis estate, and that Captain Couch will be engaged to manage the property, but Butte & Boston people say that the 90,000 shares of Davis estate stock are so tied up in litigation that no one can have an option upon them."

WYOMING.

The parties who leased 600 acres of placer ground on the Muddy, a tributary of Douglas creek, from the Douglas Consolidated Placer Company, have completed 1000 feet of bedrock flume, 4500 feet of ditches and 600 feet of fluming; they have purchased and put in place 550 feet of iron pipe running from 20 inches down to 8 inches in diameter, also all the necessary hose and other material, and will commence active operations as soon as the season opens in the spring. A test of the ground 15 feet wide, 48 feet long and 7 feet deep gave 195 pennyweights gold, very coarse, several of the nuggets weighing from 4 to 8 pennyweights each.

Arrangements have been perfected for the erection of a placer plant by Mr. Crysler on his Rock creek placer property, the price being $15,000.

Several important discoveries have recently been made at the head of Cow and Spring creeks that show well in free gold.

At Rock Springs the Union Pacific mine No. 8, which has been idle for some time, resumed operations last week, and will give employment to a large number of coal miners. All of the mines in the camp are now working regularly, and the prospects are bright for a prosperous winter.

A carload of mining machinery has been received at Rock Springs for use in the South Pass placer fields.

SOUTH DAKOTA.

Black Hills *Times*: The Metallic group, consisting of six claims in Ragged Top camp, is being developed by Hattenbach Bros., who recently purchased a one-fourth interest in the group from the original locators.

The owners of the Apex property near Rochford are putting in a big engine to replace the water power which had heretofore been relied on.

At the Tornado the product averages 140 tons per day.

At the Kicking Horse group of mines on the Blacktail divide all the ore shoots so far opened are of good grade, assays ranging from $20 to $114 gold per ton, the average value being between $30 and $40.

At the Norwich lode they have opened up a vein of ore that assays from $100 to $425 gold per ton. The vein is 4 feet wide and is capped with a 10-inch stratum of soft talc that assays $90 per ton.

Ragged Top camp now bids fair to become the richest district in the Black Hills. At the present time the ore shipments to outside smelters average 100 tons per week, which net the owners from $35 to $122 per ton in gold.

COLORADO.

Denver *Republican*: At Cripple Creek the Pennsylvania syndicate that has been developing the South Park, on Ironclad hill, during the last six months has made its first payment of $10,000 on its $55,000 bond, and stands prepared to complete the purchase of the property as the payments of the bond fall due.

Tutt & Penrose are producing an average of fifty tons a week from their work on the Geneva on Gold Hill, the ore ranging from $30 to $60 in value.

The Foley lease on the Lillie on Bull hill continues to turn out ore at the rate of thirty tons a day, and new ore houses are being erected in order that winter will not interfere with the production.

Once more the Bogart on Raven hill is coming into prominence. Two years ago it was a sensation. Ish and Hayes secured a lease a few weeks ago and began prospecting the old workings. Where the upraise connected with the old shaft the story of the past failure was told. Instead of working on the vein from which the ore came the company had done its work on a secondary vein that had cut the rich one squarely in two at a depth of 40 feet from the surface, and on the hanging walls of the intruder was lying the ore of the vein worth mining.

R. D. Kinney is shipping between sixty and seventy-five tons a week from his lease on the Lady Stith, located on Globe hill, and owned by the Gold Crater Company.

The Belle of the West, a prospect on Straub mountain, has been sold to a company formed of Chicago police officers, for, it is said, $25,000.

The machinery plant of the Cripple Creek and Gold Hill tunnel will be ready for operation in a few days, and in the meantime the contractors are driving the tunnel by hand. A large area of unprospected territory will be opened by the work between its mouth and the Moon-Anchor vein.

Production from the Moon-Anchor last week amounted to 125 tons, 80 of smelting and 45 of mill ore.

The Elkton shipped twelve broad-gauge carloads last week; four of high grade, four of second smelting grade and four of mill ore.

The Raven output was seventy-five tons of ore, and ranging from $30 to $100 a ton in value.

At Victor the Granite, on Battle mountain, has made a shipment of four carloads. One of them is high grade that may run up to $500 a ton.

The Alliance Company is arranging to resume development on its group on the south slope of Big Bull mountain.

The crosscut from the 277-foot station in the Legal Tender shaft of the Golden Cycle Company has reached the vein and finds it to be fully as rich and as wide as in the upper levels. The property is producing an average of thirty tons of ore a day.

At Telluride the Tom Boy mine is producing the most gold and paying the largest dividends of any mine in San Miguel county. The mill, comprising eight Huntingtons and fourteen vanners, treats from 140 to 175 tons of ore every twenty-four hours. The bulk of the milling ore yields as high as $40 per ton in gold.

The concentrating capacity of the Japan mill is about 150 tons of ore daily, which being reduced three and four tons into one, gives about fifty tons of concentrates that average from $100 to $125 per ton in gold, silver and lead.

The Columbia-Menona crosscut tunnel, which has been in progress for more than a year past, is in 1040 feet, with another 260 more to drive to intersect the vein 450 feet below the lowest of the upper workings. It is expected the tunnel will be completed by the 1st of January.

On an average the mill at the Smuggler-Union has been treating 175 tons per day and shipping from 80 to 100 cars of concentrates per month. Nearly 300 men are on the payroll of the company.

During October, 298 carloads of ore, aggregating 4,768 tons, were shipped from the Black Hawk depot. Compared with the corresponding month of 1895, this shows an increase of 110 cars.

The Newhouse tunnel is progressing at the rate of 300 feet per month. It is 12x12 feet in size.

One of the most promising of the recent copper discoveries is the Mule Skinner claim in Magnolia district, Boulder county. A vein of between 4 and 5 feet in width has been opened by a 50-foot shaft. The first-class material assays 10 ounces in silver, $10 in gold and about 70 per cent copper. This streak is from 10 to 11 feet wide. The matter from entirely across the vein returns a value of about $40 in gold, silver and lead.

In the Red Cliff district a tunnel is being driven into Battle mountain by Joseph Hill to develop a large tract of mineral land owned by Denver capitalists. The tract embraces 500 acres of valuable silver-bearing mineral and a lease and bond has recently been secured on 200 acres adjoining. The tunnel will be driven 6000 feet, and in its course will tap a number of veins which have already been developed at the surface.

NEW MEXICO.

The Treasure Mining Company is working about fifty men at the mine and mill. The main shaft is down 312 feet. At a depth of 186 feet a drift was run 950 feet south and a large amount of ore extracted. At 300 feet in depth levels have been run 400 feet south and 150 feet north. The mill is kept running steadily on the ore produced.

The Golden Giant Mining Company is working about forty men in the mine and mill.

Every mine in the Mogollon district which has reduction facilities is shut down, except the Confidence. The Confidence mill on Whitewater started crushing ore, with twenty stamps at work, Thursday, the 12th.

ARIZONA.

GLOBE DISTRICT.

(Special Correspondence).—The Gerard Mining Co. have their new 10-stamp mill about ready to begin pounding quartz. W. B. Gerard of New York, the president of the company, arrived just in time to see the stamps drop for the first time and will stay till the first cleanup is made.

At the Black Copper group of mines, Supt. W. W. Hill has men building roads and grading for the smelter. A new hoisting plant and 125-ton furnace will soon be in place.

The O. D. C. M. & S. Co. started another furnace a few days ago, thus giving employment to several more men at the smelter. This company is producing more copper than it ever did before and is still enlarging its works.

At the United Globe mines, Supt. E. H. Cook is pushing the new smelter to completion and will have everything running in full blast by the first of the year.

In the Green Valley mining district the gold mines are coming to the front. This district was organized years ago and a little prospecting was done on the surface. Among the curiosities is a shaft 18x18 feet inside the timbers that is down 65 feet. Recently practical miners got into the district and have resumed work in a business-like way, most of them being at work on good free-milling ore.

The most promising claim in the district at

present is the Golden Wonder, Birchett & Chilson owners. They have just finished a run of forty tons with J. I. Coleman which gave them 209⅛ ounces gold in return, 75 per cent of which was caught in the battery. This mine always was considered a bonanza, but of course it had its streaks of lean as well as of fat. However, the owners seem to understand their mine and make it average exceedingly well. They have always had some rich ore in reserve to fall back on when the next "streak of fat" did not come in as soon as expected; but of late they have had fat all the time, having had 18 inches of ore for the last 70 feet in the shaft.

Lockwood & Looney have men at work on the Gold Field. They have about fifty tons of ore on the dump, which, according to the last mill-run, assays about $85 and plates from $35 to $40.

E. E. Wann of Denver, Col., is pushing work on the Mazatzal group of copper claims, which he recently bonded from Bissig & Wentworth, and is much encouraged with the results of his work and says he expects to have a modern smelter on the property before July. W. H.

Globe, Arizona, Nov. 23rd, '96.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING NOVEMBER 17, 1896.

571,510.—WATER WHEEL BUCKET—A. Chavanne, Grass Valley, Cal.
571,646.—TEMPERING COMPOUND—Clark & Neill, Portland, Or.
571,649.—STREET SPRINKLER—Cross & Hill, Los Angeles, Cal.
571,652.—DESK—W. T. Dodd, Prescott, Wash.
571,665.—TOBOGGAN—H. P. Herron, Los Angeles, Cal.
571,529.—FOLDING BED.—H. G. Krasky, S. F.
571,679.—CONVERTING MOTION—V. & M. McCullough, Veronica, Or.
571,730.—ELEVATOR—J. Parkinson, Los Angeles, Cal.
571,731.—ELEVATOR ENGINE—J. Parkinson, Los Angeles, Cal.
571,732.—HYDRAULIC ELEVATOR—J. Parkinson, Los Angeles, Cal.
571,394.—BICYCLE HANDLE AND BELL—Prindle & Lampton, Woodland, Cal.
571,456.—MUCILAGE BOTTLE—C. W. Reeves, Los Angeles, Cal.
571,627.—CAN SOLDERING MACHINE—N. Troyer, Astoria, Or.
571,628.—PROPELLER—W. M. Tucker, Nelson Point, Cal.
571,736—AIR BRAKE—H. C. Zenke, Sandy Point, Wash.
26,310.—DESIGN FOR TYPE—W. F. Cornell, Alameda, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FOLDING-BED.—Henry G. Krasky, San Francisco. No. 571,529. Dated Nov. 17, 1896. The object of this invention is to provide a simple and effective folding-bed which may be opened out for the purpose of a bed and be free from any tendency to fold or double up, and when closed it constitutes a chest of drawers or other desirable furniture. It consists of a base frame, a head section and a foot section hinged separately and directly to the said frame and mattress stretched between the sections lying in a plane below the hinge centers of the sections, a hinged leg upon the upper portion of the front of the foot section, and means for locking the leg when the section is in a horizontal position comprising a pivoted latch on the leg, a pin in the section with which the latch engages, a pivoted lever and a means for releasing the leg from the locked position.

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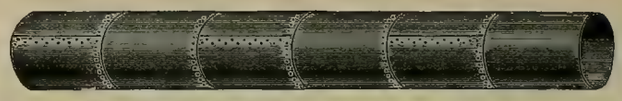

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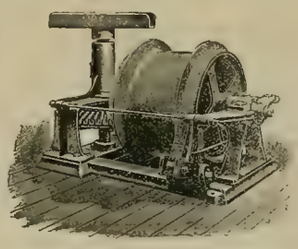

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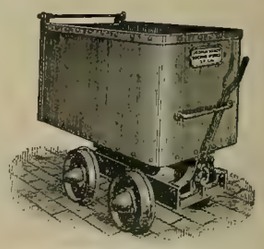

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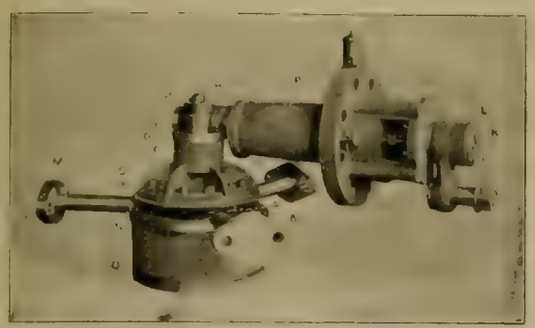

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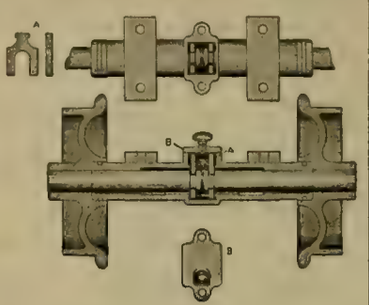

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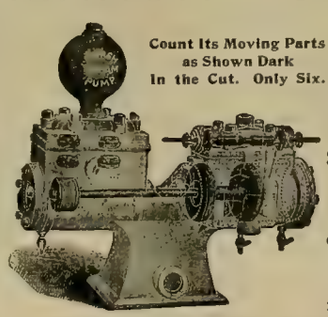

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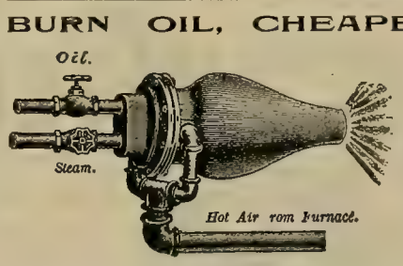

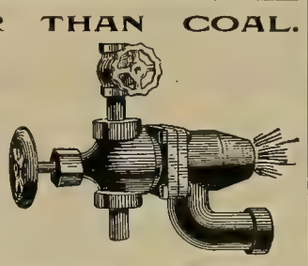

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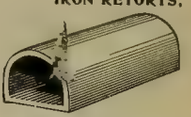

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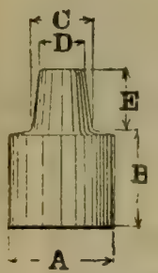

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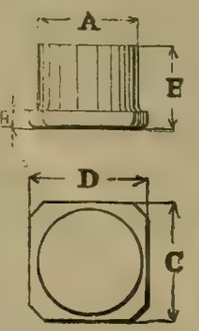

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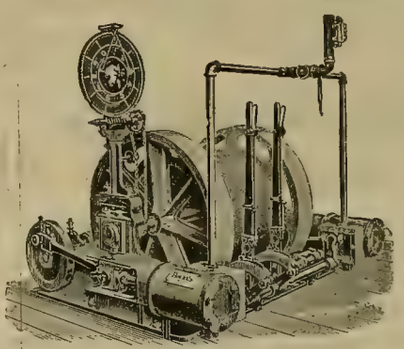

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THEY ARE THE BEST AND CHEAPEST.

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COMPLETE FREE-MILLING PLANT FOR $1,000.

Consisting of One TREMAIN STEAM STAMP, with Automatic Feed, capacity from 8 to 12 Tons a Day; One Upright Boiler; 20 Feet Electro Silver Plate, and all Pipes and Fittings necessary to connect Boiler and Mill.

Total Weight, About 5000 Pounds.

It requires no belting, shafting, pulleys or building.
Can be transmitted in section or whole. Well adapted to localities difficult of access. Weight, 3000 pounds.
Its practicability was fully demonstrated by its enormous sales of 1895, which exceeded those of two former years, and is now in successful operation in Africa, Alaska, Mexico, Colorado, South America, California, Canada, Montana, Oregon, Central America, Arizona, Dakota, New Mexico, Wyoming, etc.
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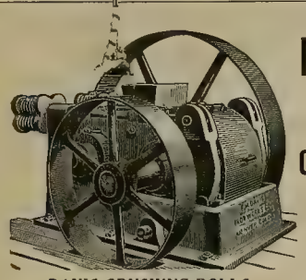

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Ores tested and amalgamation and concentration mills built to fit the ore and guaranteed to save what we say. Coal Mine equipments, Screens, Jigs, Tramways, Arastors, Chilian Mills, Ore Sacks, etc. Cornish Rolls, 12x20, weight 6,000 lbs., price $350; Feeders, Bumping Tables; Blake Crushers, 7x10, weight 8,100 lbs, only $250. Our 100 page illustrated catalogue FREE.

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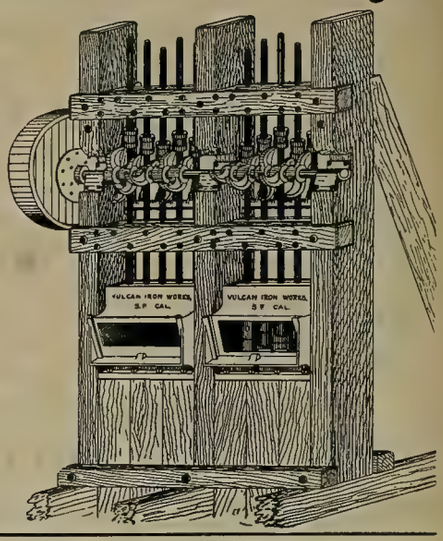

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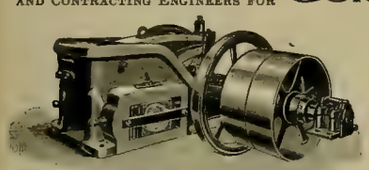

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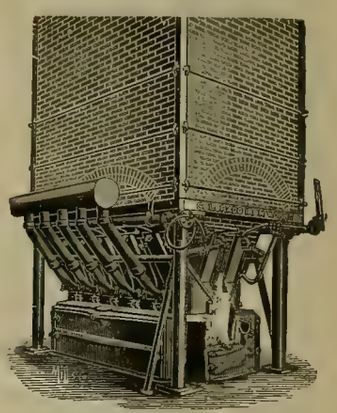

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Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

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For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

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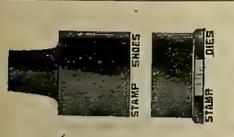

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Cheaper Than Cast Iron.

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RIX COMPRESSED AIR MACHINERY COMPANY,

11 AND 13 FIRST STREET, SAN FRANCISCO, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 25, 1896.

General rains the past week in the lowlands and snow deposits on the mountain ranges have a decided favorable effect on business. So far they are considerable in excess of that which fell during the corresponding time last year. In the agricultural districts outdoor work is being vigorously pushed with a strong probability that the acreage seeded to grain, barley and wheat, being from 25 to 30 per cent larger than last season and with favorable weather and good prices this will have a decided beneficial influence on all industry. The snow deposits are favorable for mining, for with the usual deposits during the winter months there will be an abundant supply of water well into 1897. Iron workers, in general, are quite hopeful that next year will witness more activity in foundry machinery and structural material departments than before known on this coast.

The local money market continues to grow easier, with quite an increase in the offerings of outside funds. This improvement in the situation is causing borrowers not to anticipate their wants under the belief that still lower rates of discount will rule the forepart of 1897. The rapidity with which farm products have been marketed, and at generally higher prices, is giving a good supply of funds to agricultural sections. It is stated in financial circles that many obligations have been met which, at one time, seemed as if more time would have to be given. Collections are said to be quite easy for the season of the year, while the trade owes less money.

From the East our advices continue to note a growing ease in the money markets, with more or less pressure to place idle funds. It is quite generally conceded that there will be no exporting of gold for some time at least, which will have a continued good effect on all branches of trade and industries. This opinion is based on official statistics of our foreign trade relations. According to the Bureau of Statistics, the balance of trade in favor of the United States is something unexampled in the history of the country. The balance tended the other way to the time of the panic of 1893. Beginning on July 1 of that year, which was the beginning of the fiscal year 1894, the balance turned and has been heavily in favor of the United States except one month of 1894 and the spring and summer of 1895. The figures of the excess of exports over imports of merchandise were $237,145,950 for the fiscal year 1894, $75,568,200 for 1895 and $102,896,914 for 1896. This affords an aggregate for the three years of $415,611,064. These large exports of merchandise went hand in hand with net exports of gold, amounting to $4,528,942 for 1894, $30,984,449 for 1895 and $80,588,649 for 1896, making a total for the three years of $116,102,040. The excess of exports of silver for the same period was $37,164,713 for 1894, $37,674,797 for 1895 and $46,756,408 for 1896, making a total of $121,595,918 for the three years. From the enormous aggregate of these items to the credit of the United States, amounting to $653,309,022, are to be deducted the net imports of gold and silver ore, amounting to $6,610,146 for 1894, $10,636,896 for 1895 and $15,069,908 for 1896. The net result of these figures was to leave a balance in favor of the United States for the three years ending on June 30, 1896, of about $620,000,000. The first four months of the present fiscal year have added $132,015,469 in merchandise and $17,908,573 in silver coin and bullion, and have shown items on the other side of $54,706,059 in gold imports and about $6,500,000 in imports of gold and silver ores. The figures for four months of the present fiscal year, therefore, add $89,000,000 to the apparent balance in favor of the United States and raise the gross amount for three years and a third to $709,000,000.

New York Silver Prices.

NEW YORK, Nov. 25.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	29 15-16	65⅛
Saturday	29 15-16	65
Monday	30	65⅛
Tuesday	30	65¼
Wednesday	30	65¼
Thursday	—	—

	Copper.	Lead.	Iron.	Tin.
Friday	11 35	2 97½	11 00@13 00	13 10
Saturday	11 35	3 00	11 00@13 00	13 10
Monday	11 35	3 00	11 00@13 00	13 10
Tuesday	11 35	3 02½	11 00@13 00	13 10
Wednesday	11 35	3 00	11 00@13 00	13 10

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	10c Prem
New York Telegraphic Transfer	12½c Prem
London Bankers' 60 days	$4.83¼
London Merchants	$4.83
London Sight Bankers	$4.87
Refined Silver, per oz., 1000 fine	65¼
Mexican Dollars	51½@52¼

SILVER.—The market has exhibited continued strength. At times there was a weaker feeling only to be followed by a still stronger tone. By referring to introductory remarks above, it will be seen that the exports from this country have been steadily increasing with about all of the production being taken the last fiscal year. This absorption has depleted supplies to such an extent as to make them better handling. While our exports have increased, there is nothing to indicate that stocks in England and on the continent have increased, but much to warrant asserting they are less now than two years ago.

MEXICAN DOLLARS.—The demand is slow with us, but at the East a fair movement is reported. The market is steady at fairly firm prices.

QUICKSILVER.—The demand is reported slower.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

COPPER.—The market is strong, in sympathy with Eastern and foreign advices. The East reports an improved home demand, with a continued heavy export movement. Late mail advices from New York report that to obtain supplies firm prices have to be paid. Semi-official advices from Europe show deliveries of nearly 11,000 tons during the first half of November, against an average of less than 17,000 tons monthly previously this year. In other words, a phenomenal new supply for Europe has been so closely taken up there, and that less than 200 tons accumulated in a fortnight. The European visible supply on the 16th inst. was recorded as having been 35,580 tons, against 35,440 tons on the 1st inst., and 36,220 tons on September 1st. For the first nine months of the year the exports from the United States aggregate 183,001,123 pounds, against 94,016,878 pounds for the corresponding time in 1895.

Ingot, jobbing	14¼@—
Ingot, wholesale	13½@—
Sheet copper	17 @—

LEAD.—The market is stronger at a slight advance in asking prices. The Bureau of Statistics reports the imports into this country for the nine months ending with September at 120,746,372 pounds in 1896 and 147,777,876 pounds in 1895 and the exports at 77,559,707 in 1896 and 22,543,694 pounds in 1895.

Our market is quoted as follows:

Pig	—	@	3 75
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is a good demand for all sizes.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

ANTIMONY.—Our market is quoted at 7¾@8½c in a jobbing way. New York mail advices quote 7¾@8c for Cookson's, 6½@7c for Hallett's and 6⅜@6½c for Japanese, from store.

BORAX.—Owing to strong competition, there has been quite a drop in prices.

The market is quoted as follows:

Refined, in car lots	5
Refined, in sacks	4¾
Powdered, in car lots	4½
Concentrated, "	5

TIN.—There is more inquiry for both pig and plate. The market is slightly firmer.

Pig, per lb	14¼c@ —
Plate, I C coke, heavy, per box	@$4 05
" " light, "	@ 3 95

IRON.—The market is strong with an advance asked but which consumers are slow in meeting. It is stated that the larger consumers bought quite heavily before the advances and therefore will not be in the market for much before well into next year. At the East the markets are reported strong and active with a good home demand and a fair export movement.

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 0
Gartsherrie	21 50	23 0

Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing	20

POWDER.—The market is active at unchanged quotations.

The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, " "	8½c

COAL.—Spot supplies continue to increase, but no changes in quotations are reported. Stiff prices are asked for shipments from Australia, Europe and the East.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	— —@ 5 00
Cannel	— —@ 8 00
Egg, hard	12 00@13 00
Wallsend	— —@ 6 50
Scotch Splint	— —@— —
Brymbo	— —@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —	@	— —
English, to load	9 00	@	— —
" spot, in bulk	9 00	@	10 00
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

LUMBER.—There is a continued good outward movement.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The Eastern syndicate went to pieces sooner than indicated by us last week. This leaves our market more or less demoralized, with continued cutting reported.

The market is quoted as follows:

Wire, carloads, basis per keg		
" jobbing, " "		$2 75
Cut, carloads, " "		
" jobbing, " "		2 50

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Challenge Con M Co	22	10c	Oct 14	Nov 17. Dec 8	C L McCoy, Mills Bldg
Channel Bend M Co	5	2c	Nov 9	Dec 12. Jan 2	J P Langhorne, 39 Sutter
Exchequer M Co	39	5c	Nov 14	Dec 17. Jan 11	Chas. E Elliott, Nevada Block
Goleta M Co	4	20c	Sept 21	Nov 2. Dec 2	D M Kent, 330 Pine
Greenwood G M Co, Cal	1	2c	Oct 16	Nov 23. Dec 14	Chas E Elliott, 309 Montgomery
Horsefly G M Co	1	25c	Nov 4	Dec 21. Jan 20	R T Ward, 610 Clay
Horse Shoe Bar Con M Co	5	10c	Oct 29	Dec 5. Dec 26	D M Kent, 330 Pine
Justice M Co	61	5c	Oct 14	Nov 17. Dec 8	R E Kelly, 309 Montgomery
Nimshew G M Co	2	2c	Oct 2	Nov 9. Nov 30	C D Cook, Pier 1, Mission St
Marguerite G M & M Co	4	20c	Sept 21	Nov 10. Dec 15	Chas Peach, 237 12th
Mexican G & S M Co	55	20c	Oct 9	Nov 12. Dec 3	Chas E Elliott, Nevada Block
Minaret M & M Co	1	½c	Oct 9	Nov 15. Dec 1	Geo R Armstrong, 309 Montgomery
Montecito M Co	3	15c	Sept 21	Nov 2. Dec 2	D M Kent, 330 Pine
Mt Diablo M & M Co	5	10c	Oct 27	Nov 30. Dec 21	R W Heath, 318 Pine
North Gould & Curry, Nev	17	10c	Nov 4	Dec 5. Dec 22	C H Mason, 337 California
Occidental Con M Co	25	15c	Nov 24	Dec 29. Jan 18	A K Du brow, 309 Montgomery
Reward G M Co	16	2c	Nov 11	Dec 14. Dec 30	S W Backus, Mills Bldg
Silver King M Co	15	25c	Oct 26	Dec 7. Jan 5	J W Pew, 310 Pine
Sterling M Co	3	15c	Sept 21	Nov 2. Dec 2	D M Kent, 330 Pine
Thorpe M Co, Cal	4	5c	Oct 14	Dec 12. Jan 9	A F Frey, 567 Market

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Jupiter Gravel M Co	W A Keefer, 14 Grant Ave	Dec 7

Mining Share Market.

SAN FRANCISCO, Nov. 25, 1896.

The market has been fairly active, with better prices ruling for the middle shares, in sympathy with a stronger tone in Chollar. This improvement has been largely counteracted by reports of pending assessments by the Con. Virginia and Hale & Norcross companies, the closing down, temporarily, of Crown Point and fewer men at work in the other Gold Hill mines. The strength in the Chollar shares is said to be due to the character of the work in the mines on the Brunswick, and also that a crossdrift is to be started on the 400-foot level to run for the downward continuation of the ore found above. This makes the shares a gamble; but it is to be feared that if reported expectations are realized the public will come in as buyers and send prices above the parity of their true value, and if this does take place it is only a question of time when they will recede to their legitimate value based on ore in sight, with a fair value for the probability of finding more. Although this is the midwinter holiday season, when there is more or less demand on the general trading public for expenditures, which makes it hard to promote an up move, yet there are those who think that the small pool-combine will succeed in bringing about slightly higher prices before the close of the year. If this should take place it will prove an exception to the course of the market in former years. So far as the writer can see and learn there is nothing to warrant asserting that large moneyed men are in the market, but, while saying this, there can be no doubt of their watching with close interest the work under way on both the Brunswick and Comstock lodes, with a view of coming in if a body of good, high-grade ore, mostly gold-bearing, should be developed. The continued easing of the money market and steady influx of persons from agricultural and mining sections are favorable to the pool-combine being able to unload, if so desired, at better average prices than rule at present.

Advices from the Brunswick lode are essentially unchanged so far as the general character of the work in the different mines is concerned. The improvement in the formation of the material on the 400-foot Hale & Norcross and Chollar mines is quite encouraging. On the latter level the porphyhry is softer and more greenish, which cause mining men to be quite hopeful of better results as work is pushed ahead. There is another favorable factor, viz.: as the south drifts are pushed toward Potosi there is said to be a steady improvement. Aside from the above the shaft in Hale & Norcross' ground will be at a sufficient depth within the next two weeks to begin work to open up the 500-foot level. If this level should show an improvement over the 400-foot then mining men think the legitimate market value of the shares ought to be fixed at a slightly higher value than rules now. In Occidental they are pushing work on the lower levels heretofore mentioned and at the same time preparing to go still lower so as to open up the 900 or 950-foot level. There is no particular change reported the past week in the material encountered. In Chollar they are extracting ore from the upraise on the 300-foot level. They are also preparing to crossdrift on the 400-foot level for the downward continuation of the ore found above. Unless the latter bends somewhat it is expected that it will be struck at about 40 feet. In Hale & Norcross the shaft is being sunk to the 500-foot level and the crosdrift on the 400-foot level is pushed ahead. In Savage, Gould & Curry, Best & Belcher and Con. Virginia there is nothing new to report as to the work. So far mining men seem to be greatly encouraged for the ground appears to be quite favorable, it being softer with more stringers cut and the general formation an improvement which makes them quite hopeful.

From the Comstock lode there is very little of interest to report. In prosecuting work in Alta an improvement is reported in the drifts on the 725-foot level. In Overman exploiting work is still the order. A few tons of ore are raised each week, but not enough to pay expenses. In Seg. Belcher and Belcher there is a falling off in the number of tons raised each week, owing to fewer men being at work. Where they are working is still a mystery to the public. They expect to resume work in Crown Point before long. From Yellow Jacket no news is allowed to leak out. In Confidence, Challenge, Con. Imperial, Alpha and Bullion the usual work is reported with, seemingly, no desire to strike much, if any ore. In Potosi exploiting and dead work are still the order. Better things are expected to result from work on the west croppings than from work on the 450-foot level. In prosecuting work in Chollar 126 tons of ore were raised and milled last week which gave a battery assay of $6.37 in gold and 10.68 ounces fine of silver to the ton. This barely pays expenses. From Hale & Norcross nothing new is reported. Savage milled 246 tons of ore from which they got $4,471.48 in coin. Hale & Norcross at about the same time milled 134 tons of ore which returned in coin for the gold ore $3,414.12 and left 3,255.88 ounces of fine silver to be sold. The work in Gould & Curry and Best & Belcher is to the east from the Bonner shaft. Active preparatory and exploiting work is continued in Con. Virginia on the 1750-foot, 1650-foot and 1000-foot levels. An improvement is reported on the two latter levels. The number of tons of ore raised and assay value show a falling off. From Ophir, Mexican, Union, Sierra Nevada, Utah and Andes nothing of importance comes to hand. The work is on the same levels and direction heretofore reported, with no particular change in the formation of the material encountered.

Under date of the 18th, Frank H. Pettingell writes from Colorado Springs, Col.: "The mining stock market is at present suffering from an acute attack of reaction arising from various adverse influences, chief of which is the absence of Eastern orders. It is true that directly following the election there was a sharp advance caused by heavy buying, but the purchasers did not represent strong interests and were buying in the anticipation of large Eastern orders, which have not as yet put in appearance, and probably will not until after the holidays. There is an increasing demand for producing mines, for stocks that are being actively operated; but it would appear that the period for the disposal of stocks representing claims on the outskirts of the Cripple Creek district is passed. People show a disposition to buy stocks in mining companies in the hope of an early declaration of dividends, and do not show any inclination whatever toward prospect stocks. Without question, the reign of promoters and the inventor of wild-cat propositions is passed. What people want at present, and will continue to in the future, is mining stocks in the strictest sense, and their purchasing orders will be based on production, and not on localities. There had to be some limit to the expansion of Cripple Creek; and although there

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Mining Exchange Building, DENVER, COLO.

may yet be many discoveries on the outskirts, they will have to be bona fide before the ordinary speculator will put money into them. There will probably be no great advance in stocks until after the first of the year, although present prices are liable to be sustained. There will probably be a few exceptions to this rule."

The following illustrates the changes of the week:

MINES.	Nov 19.	Nov 25.
Alpha		10
Alta Consolidated		
Andes	18	19
Belcher	30	37
Best & Belcher	77	
Bodie	52	
Bullion	14	14
Challenge	33	
Chollar	1 75	2 00
Confidence		95
Consolidated California and Virginia	1 65	1 65
Consolidated New York		
Crown Point	29	
Exchequer		
Gould & Curry	56	
Hale & Norcross		1 40
Justice		
Mexican	53	53
Ophir	1 25	1 20
Overman		60
Potosi	70	84
Savage	57	
Sierra Nevada	54	
Union	46	
Utah		
Yellow Jacket	34	34

San Francisco Stock Board Sales.

SAN FRANCISCO, November 25, 1896.

9:30 A. M. SESSION.

300 Alpha..... 10 50 Con Cal & Va. ...1 65
600 Belcher..... 34 300 Occidental..... 20
100 Chollar..... 1 95 300 Potosi..... 84

SECOND SESSION—2:30 P. M.

200 Mexican..... 53 50 Confidence..... 95
300 Con Cal & Va.....1 65 100 Bullion..... 14
250 Chollar.....2 00 150 Overman..... 09
70 H. & N.....1 40 400 Occidental..... 20
100 Yellow Jacket.... 34 600 Andes..... 19
500 Kentuck.. . ... 03 200 Eureka Con..... 25
100 Belcher..... 37 150 Ophir.....1 20

Recently Declared Mining Dividends.

The Idaho Company, Slocan, B. C., declared and paid a dividend of $20,000 on the 14th inst.

Homestake Mining Company, South Dakota, the 220th dividend, 25 cents per share, $31,500; payable Nov. 25th. The total to date is $6,056,250 and for 1896, $344,000.

Cariboo, B. C., Mining, Milling and Smelting Company, 2 cents a share, $16,000; payable Dec. 7th. This is the thirteenth dividend declared by the company since February, 1895, a total, including the present dividend, of $125,401.34.

Calumet and Hecla Copper Mining Company of Michigan, $5 per share, $500,000; payable on the 17th of December. This is the fourth dividend of like amount in the present fiscal year, the five amounting to $2,500,000. With this dividend the company will have disbursed $40,850,000 in cash dividends to stockholders, the largest dividend account of any mine in America.

Recent California Mining Incorporations.

Quartz Glen Mining Company, Calaveras; capital stock, $250,000; G. and F. A. West, W. T. Harris, J. W. Ferris, A. W. Bell.

Estorff Mining Company, San Francisco; capital stock, $75,000; $699.30 subscribed; E. E. Sutro, A. W. Myer, W. C. Spencer, J. C. Brickell, W. G. Straugh.

Bunker Hill Hydraulic Mining Company, San Francisco; capital stock $1,000,000, all subscribed; A. J. Hughes, J. J. Jones, J. A. Stephens, S. E Thurston, W. H. Lee.

American Mining and Exploration Company, San Francisco; capital stock, $250,000; $250 subscribed; W. Kolman, W. H. Harrison, F. McCue, E. W. McKinley, C. A. Webster.

Oleta Gold Mining and Power Company, San Francisco; capital stock, $2,000,000; $2500 subscribed; W. E. Holbrook, H. Routledge, I. N. Chapman, J. B. Goldstone, A. Bannister.

Mineral King Mining and Milling Company, San Francisco; capital stock, $500,000—$412,500 subscribed; E. J. Hegarty, F. X. Simon, T. P. Rourke, San Francisco; J. Sheeby, San Rafael; J. H. Rourke, Alameda.

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from Edgar Maylone, in the Bald Mountain mine, near Fair Play, El Dorado county, to deposit tailings in Spanish creek; from Nickelson & Williams, in the Crawford diggings, near Camptonville, Yuba county, to deposit tailings in Bridger creek; from McDonald & Hoffman, in the Gilbert mine, near Yankee Jim's, Placer county, to deposit tailings in Devil's canyon; and from the Oregon Gold Mining Company, in the Forty-nine mine, near Enterprise, Butte county, to deposit tailings in a ravine, gives notice that a meeting will be held at room 69, Flood building, San Francisco, Cal., on December 7th, 1896, at 1:30 P. M.

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Commercial Paragraphs.

MILWAUKEE telegrams say that the E. P. Allis Company has had $250,000 worth of additional contracts on its books, and work on these will begin at once.

THE steamer Jas. Spiers, built by the Fulton Engineering and Shipbuilding Co. of this city for the Hawaiian trade, was given her trial trip last Tuesday and exceeded all expectations. The vessel will be immediately placed in service.

THE Cleveland Steel Company, owned by the Rockefellers, is erecting a big crucible steel plant, and will manufacture that article on a large scale. It will be the only concern of the kind in this country, as all crucible steel, which is used for the manufacture of cutlery, fine tools, etc., is now imported from Sweden.

"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address. *Illustrated Weekly*, Denver, Colo.

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Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star mining district, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 24th day of November, 1896, an assessment (No. 25) of fifteen (15) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 18th day of January, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

GREENWOOD GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Greenwood, El Dorado county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No 1) levied on the Sixteenth (16th) day of October, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Adams, Grove	7	11,000	220 00

And in accordance with law, and an order from the Board of Directors, made on the 16th day of October, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 79, Nevada Block, 309 Montgomery St., San Francisco, California, on MONDAY, the 14th day of December, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

CHAS. E. ELLIOTT, Secretary.

Office—Room 79, Nevada Block, 309 Montgomery St., San Francisco, California.

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In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold ama gamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.
SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY.
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO.
C. C. McIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

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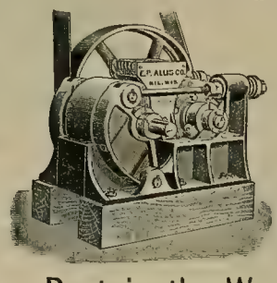

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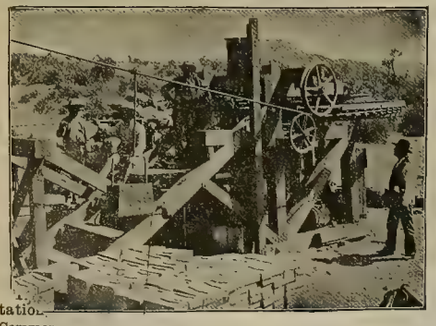

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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1900.—VOLUME LXXIII. Number 23. SAN FRANCISCO, SATURDAY, DECEMBER 5, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Two Debris Dams.

It is not generally known that even before the passage of "the Caminetti Law" hydraulic miners in this State built dams to impound debris. Some of these dams were built nearly twenty-five years ago, and higher, the earth forming a solid, compact mass, the water oozing into the spillways or passing over the top, as seen in the pictures.

DEBRIS DAM ON ROCK CREEK, SIERRA COUNTY.

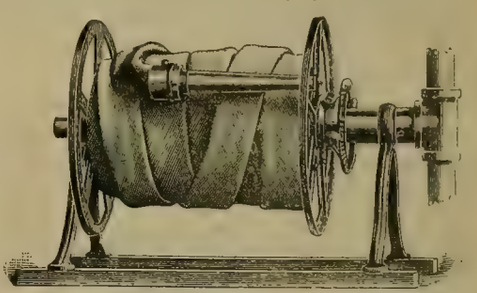
and serve the purpose for which they were intended. Two of these old debris dams are illustrated on this page, the upper cut being of a dam on Rock Creek, Sierra Co.; the lower, one on Slate Creek, in the same county of this State. These engravings are made from photographs taken by the chief officer of the United States Debris Commission, and give a good idea of those structures. The dams of which the two illustrations are a type were and are not built at once. As the canyon or gulch site of the dam filled with debris, the dam was built up higher and higher, the earth forming a solid, compact mass, the water oozing into the spillways or passing over the top, as seen in the pictures.

DAM FOR RESTRAINING MINING DEBRIS, SLATE CREEK, SIERRA COUNTY.

THE time has come when the United States should make better provision for the Government of Alaska. At present it is a judicial district without even the dignity of a territory and governed by the laws of Oregon that were in force prior to 1884. The discovery of rich mineral deposits in many parts of the country has attracted a large number of people there during the past two years. Many of them have become impressed with the value of the mines and some of these are remaining over the winter. Others will return in the spring. As the country becomes better known the possibilities of its future seem promising. However, it has not been the policy of our Government to assist the miner in his work of pioneering. A very small expenditure on its part would do much toward assisting in the development of sources of great wealth.

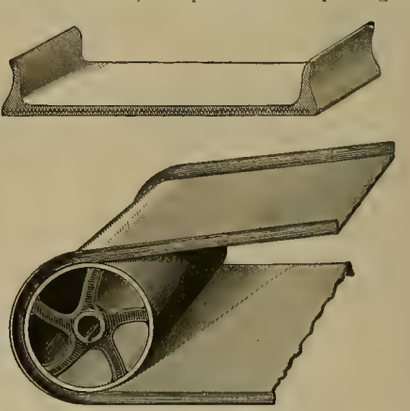
New Automatic Hose Reel.

In the reel illustrated the act of unreeling the hose opens the valve, thus instantly yielding a full supply of water for the point of danger. Though a part of, and in combination with, the reel, the valve can be operated independently, thereby doing away with the necessity of a gate valve on each outlet where a reel is used. This combination is unique, economical and perfect in action. The reel is made for 1½ and 2½-inch fire hose, carrying from 50 to 100 feet in length, as required. It is manufactured by the Gutta Percha and Rubber Manufacturing Company of New York, the Pacific coast branch being at 32 Fremont street, San Francisco.



NEW HOSE REEL.

The "Spadone" concentrator belt illustrated is also made by this company. Its valuable feature is the improvement on the edges, standing at right angles with the belt, except when it is passing over the rolls. At this point it curves over and outward, and after leaving the roll regains its shape easily and naturally. The rubber used in this edge is of high grade and specially elastic, to guard against the liability of breaking as it passes over the rolls, and to withstand long usage. Although not long on the market, a large number of these belts are in satisfactory use.



THE "SPADONE" CONCENTRATOR BELT.

A GOOD indication that confidence in placer mining is not lost is the fact that last week eight locations of gravel were recorded in Auburn, Cal. The same number of quartz mines were also recorded.

MINING AND SCIENTIFIC PRESS.

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J. F. HALLORAN.....General Manager

San Francisco, December 5, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Debris Dam on Rock Creek, Sierra County; Dam for Restraining Mining Debris, Slate Creek, Sierra County; New Hose Reel; The "Spadone" Concentrator Belt, 457. Water Ram in Pipes, 462.

EDITORIAL.—Two Debris Dams; Better Government for Alaska; New Automatic Hose Reel; Gravel and Quartz Mines Recorded, 457. Roads and Mining; The Proposed Removal of the Mining Bureau to Golden Gate Park; Sixteenth Annual Report of the U. S. Geological Survey; The College of Mines, 458.

SCIENTIFIC PROGRESS.—Waste Made Valuable; Uncle Sam's Guns, 462.

MECHANICAL PROGRESS.—Water Ram in Pipes, 462.

ELECTRICAL PROGRESS.—An Electric Hæmostat; To Supply New Zealand Gold Fields with Electric Power; Expansion of the Telephone Service in Japan; An Electric Railway for Mount Blanc; X-Rays Among Fireflies, 462.

PRACTICAL INFORMATION.—The Amount of Water in the Earth's Crust; New Small Coins; Amount of Moisture in Green Wood; A Charter for a Railroad from Lake Nicaragua to the Caribbean Sea; Copper and Bronze Coins, 463.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 466-7.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 474.

MISCELLANEOUS.—Concentrates, 459. Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process; Africa's Small Yield; Notes on a Breathing Gas Well, 460. The Greatest Gold Belt; The Smuggler-Union Mines, Telluride, Colorado; "Gold Mining in British Guiana;" Manganese Ore from Leadville, Col., 461. Coast Industrial Notes; Personal; Obituary; Recently Declared Mining Dividends; Recent California Mining Incorporations; Commercial Paragraphs, 465.

Roads and Mining.

There is a feeling of opposition to the building of railroads up into the mining districts along the Sierras among certain classes of people, which resembles very much the old antipathy that many years ago prevailed among workingmen against labor-saving devices. Nowadays the laboring people are as quick as any to recognize the advantages that will accrue to them from the introduction of labor-saving machinery.

A mining man from Calaveras is reported, in the Stockton *Mail*, to have said on this subject:

There is a feeling up in the mining region that a railroad will hurt the community instead of benefiting it, and it is not confined to any small number of people either. The teamsters would be knocked out by a railroad; and there is a good deal of teaming up in that region. The stage lines would be hurt, and I suppose that in Calaveras county about a hundred horses are worked daily in the stage business. Considerable lumber is cut in the mining region, and that industry would go under because the mills could not compete with the lumber sent up from this city. Then there are small farmers, who raise hay for the home market and get from $15 to $20 a ton when it is selling here for $6. They would be affected. Of course the same conditions would apply to the vegetable-raising business, for you can buy as much garden truck here in Stockton for 15 cents as you can there for 50 cents. There are few vegetables raised, so that doesn't cut any figure. Generally speaking, all classes of producers who depend upon the soil for their support would be affected, because they would be brought into competition with the valley, whereas at present they are to a large extent independent of your valley prices owing to the cost of sending produce up into the mines by team.

Probably very few of the people referred to would not be benefited in the end by the changed conditions and greater prosperity of the mines. It must be remembered that but for the activity in the mining industry they would not make even a living. Up in Siskiyou county, where a wagon road was being built over Salmon mountain to Sawyer's Bar, an old fellow who had a cabin on the trail at the foot of the divide, and had for years made a living by helping the packers load and unload their mules at their camping place, insisted that the country was going to the dogs because pack trains would no longer come his way.

Railroads and good wagon roads will in time do as much as anything else to reduce the cost of working mines and of milling the ores. Owing to the reductions that have taken place ten mines are now worked where one could be years ago. Even a slight further reduction in this cost will mean that many thousands of tons that cannot now be worked would yield a profit. Every cent of reduction in the cost per ton will mean the addition of great wealth to the State.

The College of Mines.

The Los Angeles *Times* in an editorial advocates the establishment of two schools of mines in California—one in the northern and one in the southern part of the State—and says that we have at present no school of mines in the United States. The *Southwest Miner*, published at San Bernardino, takes exception to the statement that there is no mining school in America, and while admitting that California has no mining school, speaks of the South Dakota and Colorado schools of mines as the only ones in the country. No mention is made of the Columbia school of mines at New York, one of the best equipped departments in the second richest university in America.

It seems rather strange that an institution like the University of California, which is recognized in the East as one of the great institutions of learning in this country, is so little known in this State. There is a school of mines at the University of California, and has been for many years. It is well equipped with libraries, mineral collections, mills and reduction works for illustrating metallurgical methods, and shops. In fact, the buildings and equipments available for the mining student could not be duplicated for $1,000,000. The salaries paid to the professors in the different departments in which the mining student pursues his studies amounted to $68,090 in 1895. These salaries included for the Professor of Metallurgy and his assistant, $6540; for the Department of Geology and Mineralogy, $7600; Chemistry, $9120; Mathematics, $13,200; Civil Engineering, $11,240; Mechanical Engineering, $9890; Physics, $10,500. This does not include any of the salaries paid to the president and the administrative officers; nor to professors in other departments in which the student in the college of mines may take lectures in order to round out his education. The annual salaries of the whole University paid for teachers amount to over $300,000. In point of wealth it ranks fourth in the United States. The president of Harvard University, not long ago, spoke of it as one of the five great universities of America.

Now, as to the professors, the University Register gives the following as the heads of different departments in the School of Mines: Stringham, mathematics; Christy, mining and metallurgy; Hesse, mechanical engineering; LeConte, geology; Rising, chemistry; Slate, physics; Soule, civil engineering; Lawson, field geology and mineralogy; Ardley, free-hand drawing; Kower, mechanical drawing. Most of these men are well known in the scientific world outside of California and outside of the United States.

To be sure, many of these men lecture to other students than those of the College of Mines; but were all the scientific colleges built up separately, with separate faculties, each one would make a very poor showing with the money that has been spent. For the State to establish another School of Mines, with as able a faculty and capable of doing as good work as that which Berkeley is now doing, would cost at least $2,000,000. And the Los Angeles *Times* suggests the establishment of two mining schools, one north and one south of Tehachapi, each at a cost of $50,000. The interest on that sum would not pay the salary of one of the members of the faculty of the California School of Mines.

The School of Mines can be improved. It is somewhat cramped for room for lectures and for its large and valuable collections of minerals, which is hardly second to any in America.

Regent Reinstein has obtained promises of gifts of money that will amount to over $4,000,000, to be applied to the erection of buildings and increasing the endowment funds of the University. Within the next ten years no doubt other large sums will be obtained, and Mr. Reinstein and those associated with him, in their plans for the enlargement of the University, expect to make the present mining school the best in the world. This will involve the expenditure of from $1,000,000 to $2,000,000.

It can safely be said that at present the University of California has a good mining school. Among its graduates are some of the leading mining engineers of the world. Of these Gardner Williams is in charge of the great Kimberley diamond mines; H. H. Webb is chief engineer of the Consolidated Gold Fields in South Africa, who own principalities and control millions; Charles Butters and others have taken high rank in the mining world.

The Proposed Removal of the Mining Bureau to Golden Gate Park.

It has been proposed in two of the San Francisco dailies that the State Mining Bureau be moved out to Golden Gate Park. One of them says: "The advantages of such a change are so obvious that we cannot foresee any serious objections to the plan. Where one person now inspects the exhibit of California's mining resources, fifty would see it in the Park."

Why not, then, propose to move the State University out to the Park? Where it is now located not more than one visitor in ten thousand ever sees it.

The main purpose of the Mining Bureau seems to have been lost sight of by these papers. It was not established as an advertising medium. The State Mining Bureau act of March 23, 1893, provides as follows:

It shall be the duty of said State Mineralogist to make, facilitate, and encourage special studies of the mineral resources and mineral industries of the State. It shall be his duty to collect statistics concerning the occurrence of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make a collection of typical geological and mineralogical specimens, especially those of economic or commercial importance, such collection constituting the Museum of the State Mining Bureau, to provide a library of books, reports, and drawings bearing upon the mineral industry, the sciences of mineralogy and geology, and the arts of mining and metallurgy, such library constituting the Library of the State Mining Bureau; to make a collection of models, drawings, and descriptions of the mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections and library as to make them available for reference and examination and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of this State, to consist of such collections and library, and to arrange, classify, catalogue, and index the data therein contained, in a manner to make the information available to those desiring it, and to provide a custodian specially qualified to promote this purpose; to make a biennial report to the Board of Trustees of the Mining Bureau, setting forth the important results of his work, and to issue from time to time such bulletins as he may deem advisable concerning the statistics and technology of the mineral industries of this State.

The bureau is an educational institution and is doing good work in that direction. Its published papers give the results of its most valuable work. These are forwarded free, upon application, to any who may require them. Those who have business with the bureau are people interested in the questions that may be answered there, and who go there for information. As to this, Mr. Henry S. Durden, the curator of the museum, says:

To move the museum to the Park would very largely detract from its value to our mining and business men. A large proportion of our visitors are in search of information. They come to study various ores and formations, and the modes of occurrence in nature, of the mineral they are in quest of. They also want to actually *see* the mineral, that they may be able to judge of its suitability for their purpose, resemblance to other samples with which they are already acquainted, etc.

Busy men cannot always afford the time that it would require to go to the Park for such investigations, and, as the first and main object of the institution is practical utility, it is certain that its usefulness would be much diminished by moving it so far away.

It might be visited by a larger number of mere sightseers if removed to the Park; but, as it was never intended to be a mere show, where the idle could while away an hour or two, but was created for purposes of practical utility, that would be no argument in favor of moving it.

If moved at all, it should be to a position more central to the mining and manufacturing interests, i. e., nearer to Pine and Montgomery streets.

THE sixteenth annual report of the United States Geological Survey has just been published. Director Walcott explains some changes in the policy of the survey that will be of interest to miners. One of most practical importance has been to bring the survey more in touch with some of the economical and educational interests of the country.

Concentrates.

THIS is the nineteen hundredth issue of this paper.

THE Red Mountain road will be in Rossland, B. C., this week.

ORE is hauled at Butte, Montana, on cars of the street railway company.

THE Sacramento mine of Mercur district, Utah, has posted its first dividend.

TWELVE mineral locations were made in San Bernardino county last week.

THE Anaconda Company, in Montana, has at its brick yards nearly 60,000,000 bricks.

THE Central Hill hydraulic mine in Calaveras county, Cal., produced $14,500 for the season's run.

HAMILTON SMITH'S Idaho visit is partly to make a report on the Helena & Frisco mine, Gem, Idaho.

THE Johannesburg decision in the cyanide patent cases applies only to the South African Republic.

THE United States Geological Survey is making a topographical survey of the Tintic district in Utah.

A NEW ruby bearing tract has been discovered in Upper Burmah which is said to be rich in that mineral.

THE first steps were taken at a meeting of brokers at Spokane, Wash., last week to form a mining exchange.

ANOTHER organization to deal in coast mining property is being started in this city to begin business early in '97.

JOHN TAYLOR & Co., 63 First street, San Francisco, supply manganese, ground and sacked, for the chlorination process.

WITH the opening up of mines, especially gold mines, all over Nevada, the outlook for prosperity in that State is good.

A PETITION to the Northern Pacific asks for the building of a branch road to the Gebo coal fields in Carbon county, Mont.

DURING October, '96, the Alaska Treadwell G. M. Co.'s ore averaged $2.84 per ton value; the expenses were $1.10 per ton.

THE Yellow Metal Mining Co., 927 Market street, S. F., are going to put a 20-stamp mill on their property at Angels, Cal.

THE Mercur Company will fight the assessment of $10,000 levied on its output for the past year under the State laws of Utah.

DURING the first ten months of '96 silver shipments from San Francisco aggregated $10,174,228 in value; gold shipments $11,469,370.

AN organized effort is being made in Colorado to bring influence to bear in Congress to establish a Department of Mines at Washington.

FOR the first ten months of 1896 the United States produced 157,910 tons of copper, an increase of 29,718 tons over that of the same months last year.

THE page compilation in last week's issue is believed to contain everything of value up to date regarding recent reference to the cyanide process.

EMPLOYMENT is being given many men on assessment work in different parts of the State, for the time within which it must be done is becoming short.

THE prospecting season is over in British Columbia, but on many locations the owners succeeded in making preparations in time to do development work all winter.

THE Palmer Mountain Gold Mining Company at Loomis, Idaho, proposes to run a double-track tunnel 3600 feet into Palmer mountain to tap and work the mines.

MANY of the statements weekly appearing on this page are answers to questions received by mail, the information asked being deemed sufficiently important to publish.

THE gold production of the United States for 1895, as received by the mint bureau, was $53,026,355. This was an increase of 35 per cent over the production of 1894.

THE capacity of La Colorado mill at Minas Prietas is to be doubled and cyanide plants of 100 tons capacity each are to be erected at La Colorado and Minas Prietas mills.

THE Black Oak mine in Tuolumne county, near Soulsbyville, is reported to have been sold to Leopold Meyers of Brussels and Charles L. Meyers of New York for $500,000.

THE claim jumper will be in evidence again as usual on the first of January and those who have locations will do well to see that their assessment work is done before that time.

ON the new railroad, 60 miles long, between Leadboro and Townsend, on the Northern Pacific, the first that went over the line was loaded with 300 tons of ore for Helena smelters.

AT Savonnas, B. C., at the lately discovered cinnabar deposits, large bodies of rich ore have been blocked out, and new locations are being made. A company is now erecting a furnace.

A LIST of the prices of the shares of nineteen of the leading mines in British Columbia, giving their price January, 1895, and September, 1896, shows that there has been an increase of nearly 600 per cent.

THE promoters of the proposed Sierra Pacific Railroad from Stockton to the mines of Amador and Calaveras counties have taken active preliminary steps that indicate that they will push the scheme through.

TWO new discoveries of gold, one of quartz and one of gravel have been made in Wales, the latter in the sands of the Mawddach river. Applications for dredging have been granted by the authorities.

SEVENTY-EIGHT liens are reported filed against the Golden Scepter Mining Company at Phillipsburg, Montana, aggregating $100,000. The lien of Fraser & Chalmers of Chicago is the largest, amounting to $51,000.

THE "suspension of assessment" law applied only to the calendar years '93 and '94, and non-performance of assessment work for '95 and '96 leaves such unpatented mining locations subject to relocation January 1st, '97.

THE Cariboo gravel mines are mostly closed for the winter and a number of miners are on their way to California. There will probably be a larger influx of miners from the North for the winter than ever before.

THE Manitoba *Free Press* advocates the construction, with government aid, of a refinery to treat Canadian ores and the building of a railroad into the Kootenay country in order to make it once more a Canadian possession.

SUCH a number of Senators and representatives have expressed themselves so strongly in favor of the establishment of a Department of Mines and Mining that any move made in Congress will be sure of serious consideration.

THE Secretary of the Treasury has issued an order removing the restrictions placed upon the importation and sale in the territory of Alaska, except the islands of St. George and St. Paul, of breech loading rifles and ammunition.

IT is reported that a coal mine has been discovered at Sudbury, Ontario, and Prof. Coleman of the Ontario Bureau of Mines has been sent to report upon it. At present all coal used in Ontario is brought from the United States.

FROM January 1st, '96, to date there have been exported to Europe about $45,000,000 in gold and $34,000,000 in silver. During the same time the gold imports to that port aggregated over $75,000,000 and the silver imports $5,000,000.

THE Sierra Buttes Consolidated Gold Mining Company has been organized by San Francisco and Nevada county people to work the old mine of the same name in Sierra county, from which several millions were taken by the English owners.

MRS. N. COLLINS, Columbia Falls, Montana, is superintendent of the Montana Queen Mining Company, and will this winter give "her personal attention" to the development of the Montezuma and Reindeer. In the spring a smelter is to be erected.

THE silver miners in Colorado, Nevada and Utah are taking a very philosophic view of the result of the election, and in spite of their disappointment there is evidence already of increased activity in all directions. Of course, gold mining comes in for most of this.

IT has been discovered that a law passed in Canada last year will disfranchise most of the voters in the Kootenay country, for it provides that only British subjects may vote at municipal elections. This would leave not many more than twenty voters in Rossland.

NOT to be behind the rest of the world, "eight prominent society ladies" of Spokane, Wash., have organized "The Woman's Northwest Mining and Investment Co.;" capital $2,000,000. It is their announced intention to "actively engage in the mining business."

THE heavy falling off in the output of gold in Australia, and the failure to increase the output in Africa this year, is doing much to cause the lively increased interest British investors are taking in the mines of California, Colorado and other parts of the West and British Columbia.

THERE have been many representatives of capital in Cripple Creek and other parts of Colorado of late, and it is claimed that in that camp more big enterprises have been founded during the past month than for six months previous. In the meantime the output of gold continues to increase.

THE De Lamar mine of Idaho report for October is as follows: Crushed during the month, 4153 tons; bullion produced in mill, $58,065; estimated value of ore shipped to smelters, $4000; miscellaneous revenue, $315; total produce, $62,380; total expenses, $44,890; profit for the month, $17,490.

THE Blaine tunnel of the Trade Dollar group and the Idaho tunnel of the Black Jack group of mines in Idaho have been connected, making an opening through Florida mountain. The Blaine tunnelis 4317 feet in length and the Idaho tunnel 3200 feet, making a total of 7517 feet, or nearly one and one-half miles.

THE air compressors within three miles of Rossland have a capacity of 160 drills, an increase from ten a year ago when the Le Roi had a 7 drill compressor and the War Eagle a 3-drill compressor. Orders have been placed for fifty drills more. The Le Roi's new plant will have a capacity of forty drills.

THE California State Mining Bureau does not make assays, leaving that to private assayers, whose business it is. But where a new mineral or one peculiar in any way is forwarded to the bureau a quantitative test will be made. All minerals forwarded will be qualitatively determined, but that is very different from a quantitative test.

THE water pipes crossing the Crescent mine leading to the Silver King, at Park City, Utah, were cut last week by James McGregor, the owner of the former mine, and the Silver King was forced to shut down, some 200 men being thrown out of employment. There has been a suit pending for over a year between the two companies in the premises.

THE placers of the State of Nevada are attracting attention of men with means. In the Gold Creek district, formerly known as Island Mountain, seventy-five miles north of Elko, the Gold Creek Mining Company, which has secured several thousand acres of gravel, has over two hundred men at work constructing a reservoir and making other preparations for work.

THE new mining exchange formed at Rawlins, Wyoming, has good cause for existence. The quartz mines on the Sweetwater and Grand Encampment have promised well. Besides, there are large and very important gravel deposits, both north and south of Rawlins, well worth exploiting, but none of which can be worked without the expenditure of considerable capital for water.

AFTER all Hamilton Smith will not come out here to investigate the Mariposa grant—at least not at present—according to the latest advices. He was in Spokane on Thanksgiving Day, having gone there from Butte to look into the Helena & Frisco, for which he was negotiating for the Exploration Company. It was his intention to go to New York and then to return to London before Christmas.

RECENT reports on the cost of the cyanide process in South Africa show that at the Crown Reef for the twelve months ending March, 1895, it was 2s 11.473d per ton; at the Geldenhuis Deep in July, 1896, 8100 tons cost 2s 7d per ton; at the Geldenhuis Estate the cost in the same month was 2s 6.24d per ton, and in the City and Suburban in August it was 2s 3.608d.

A TELEGRAM from Butte, Montana, announces that the last obstacle to the reorganization of the Butte & Boston Co. has been removed by the sale of the 90,000 shares of stock held by the Davis estate, the sale having been made under an order of the Massachusetts court for $2 a share. It is predicted that the reorganization will now be speedily perfected, and that the vast properties in Butte will be in operation in a few months.

JOHN FERGUSON'S little 2-stamp sampling mill in Sonora claims the record for turning out bullion. According to the *Union-Democrat*, during the palmy days of the Bonanza mine, when $380,000 was taken out in one day, John Ferguson ran through his mill $40,000 in four hours, or at the rate of $10,000 per hour. The bullion was so free from quartz that he had to hang the stamps up twice to remove the precious metal from the battery.

IT is the intention of the Blue Lakes Power Company, as soon as their contract to furnish 1500 H. P. to the California Exploration Company is completed, to furnish power to any miner and mining company along the mother lode in Amador and Calaveras counties as rapidly as possible. The company own the Stockton Water Works and will supply that city with water from their reservoirs instead of that now procured near Stockton.

THERE were 2417 carloads of freight handled at Colfax from January 1 to December 1. This was an increase of 50 per cent over the amount handled last year, and was due to the increased activity in mining. More freight was received at Colfax than at any other station between Sacramento and Ogden. It is a distributing point for Colfax, Forest Hill and Iowa Hill in eastern Placer, and the towns of Grass Valley and Nevada City in Nevada county.

THERE is paid out in the Rand, South Africa, for labor and stores annually about £7,000,000. Of this sum £2,400,000 is paid for white labor at an average of nearly £300, or $1500 per annum. For Kaffir labor £2,000,000 is paid to 60,000 natives, who receive about one-fifth the pay of the white laborers. It is said that the white laborers do not look with favor upon the movement to reduce the wages of the Kaffirs, believing that it will be only a question of time when theirs will be attacked.

THE Cloud City Miners' Union of Leadville last week issued an address to Governor McIntyre and the people of Denver in which it attempts to show that a conspiracy existed among the mine owners for the purpose of keeping the State troops in Leadville until the Union is disorganized. The miners disclaim responsibility for the Coronado and other outrages that have occurred there, and offer to guard the property and aid in maintaining peace, if the troops are withdrawn.

THE Southern Pacific and Santa Fe companies are both reported to have made surveys into the Randsburg mining district, one from Mojave and the other from Kramer. It is said that the Southern Pacific Company contemplate building one into Death Valley. A telephone line built by private capital now runs from Mojave into Gerlach station. It is to be extended into Randsburg, a distance of some twelve miles. A private telegraph line is to be built into the district by Los Angeles capitalists.

WHEN the question of obtaining a supply of water for milling purposes has been settled the Randsburg mines in Kern county will probably turn out considerable gold. Nearly all the locations are owned by men without much capital, but sufficient development work has been done to show large deposits of good paying ore. It would appear from what has been done in the way of sinking wells for water, that a good supply will be obtained before long. At present a 10-stamp mill is being erected by parties who have obtained sufficient water at a depth of 190 feet.

ON the 17th inst. the Calumet & Hecla of Michigan will pay a $500,000 dividend, the fifth of like amount for the calendar year, making a total aggregate of cash dividends paid by that company $46,850,000. For a long time the Cal. & Con. Va. of Nevada have stood at the head of the list of dividend-paying mines. The Cal. & Con. Va. consolidated in '84. Taking the two together, that property is still far ahead of any other mining property on the continent as a dividend producer. Prior to consolidation Con. Va. paid in cash dividends $42,390,000 and California $31,320,000; since then they have paid $3,948,800, a grand total of $77,658,000.

IN his annual report Secretary Carlisle will propose measures for a partial cancellation of the paper currency. He will suggest that the notes now held by the Treasury, constituting its free cash balance, shall be destroyed. This operation would involve the retirement of about $40,000,000 of Treasury notes and about $53,000,000 of greenbacks, and would reduce the amount of outstanding paper payable in gold to a more conservative scope in relation to the amount of gold held for redemption. The difficulty with this suggestion at present is the lack of revenue. As matters now stand, the Treasury meets deficits with its surplus cash. Take away that cash and borrowing will be necessary to meet current expenditures.

THE General Land Office has decided, in favor of A. A. Goldstein, his claim under a mineral location to a large part of the townsite of Juneau, Alaska. In 1886, after several others had filed and abandoned, A. A. Goldstein, a merchant, located on a mineral claim which included nearly the whole of the present site of Juneau. More than the necessary amount of assessment work was done to secure the patent, and, when two years later a regular application was made, the citizens began a concerted movement to kill it. At a mass meeting in 1888 Goldstein, who was by force compelled to be present, was asked to give up his claim on threat of lynching. This he refused, but he agreed, in the event of securing a patent, to deed, free of charge, to actual occupants all property improved or held by them.

AN example of a big mine working large amounts of ore at a very small profit is given in the Geldenhuis Deep, South Africa. In twenty-seven days' run the manager reports as follows: "Crushing from mine, 15,227 tons; and from development dump, 493 tons; yield, 3542 ounces; cyanide treated, 9500 tons, yielding 1975 ounces." On this the net profits were $2000. The report from the Robinson tells a different story. The manager cables on the work for October as follows: "Mill: 120 stamps at work; 16,500 tons of ore crushed; yielded in smelted gold, 12,017 ounces; from concentrates (by chlorination), 935 ounces; from tailings (cyanide process), 2695 ounces; from slimes, 1023 ounces; from own ore, 16,670 ounces; from concentrates bought (by chlorination), 3348 ounces. Total gold recovered, 20,018 ounces." On this the profits were $200,000.

NO 20-cent silver pieces have been coined at any of the United States mints since by an act passed in May, 1878, such coinage was prohibited. The coinage of this piece went on for five years only, and the weight of the coin was 77 grains. There are now of them outstanding about $160,000. Since February, 1887, no trade dollars of silver have been coined, and the total amount of these in existence, though not in circulation, is now $35,000,000. An old coin of silver very rare nowadays is the silver half-dime of 20 grains, the coinage of which was originally authorized by act of Congress in April, 1792, more than a century ago. The coinage of half-dimes was continued until 1873. The coinage of gold dollars was discontinued in 1890. Prior to that time nearly 20,000,000 gold dollars had been coined, and many of them are still in active circulation. The first of them were coined under a law passed in 1849. The three-dollar gold pieces, coined between 1853 and 1890, were 77 grains in weight, and there are of them outstanding $1,500,000 worth.

Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process.*

NUMBER V—*Concluded.*

By H. VAN F. FURMAN, Denver, Col.

A number of other methods for the determination of the available cyanide have been proposed, but that first described is believed to be the best.

In a well-regulated mill the strength of the solutions is tested on each tank every four hours while the solutions are percolating.

The method usually adopted for the determination of the free potassium cyanide in mill solutions is as follows: 10 c.c. of solution are diluted with distilled water to 65 or 70 c.c. and titrated with the standard silver nitrate solution, without the use of an indicator. When all the free potassium cyanide is changed to $KAg(CN)_2$ an additional drop of the silver solution produces a distinct white opalescence, owing to the formation of insoluble zinc cyanide, thus:

$$K_2Zn(CN)_4+AgNO_3=KAg(CN)_2+Zn(CN)_2+KNO_3.$$

It is probable that this second reaction commences before all the potassium cyanide is combined with silver; for on partly titrating a solution containing both salts, and allowing it to stand, a white precipitate slowly forms. Hence the titration must be performed rapidly, in which case the separation of the white precipitate can be taken as marking the end point. The titration requires some practice to be performed properly.

7. DETERMINATION OF THE FREE HYDROCYANIC ACID IN SOLUTION.

To 10 c.c. of the mill solution add 10 c.c. of a solution of potassium bicarbonate (containing 15 grammes of $KHCO_3$ to the liter), dilute to 65 or 70 c.c. and titrate as in Test 6, without the use of potassium iodide as an indicator. Upon the addition of the bicarbonate the following reaction takes place:

$$HCN+KHCO_3=KCN+CO_2+H_2O.$$

The titration gives the HCN in terms of KCN, and $KCN\times 0.415=HCN$. As this titration gives the potassium cyanide and the hydrocyanic acid, the difference between this result and that obtained in Test 6, multiplied by 0.415, gives the hydrocyanic acid.

For each c.c. of mill solution taken 1 c.c. of the potassium bicarbonate solution is used. This will be sufficient for solutions containing as much as 0.4 per cent of HCN, which is much higher than mill solutions usually run, but the excess does no harm.

The addition of the bicarbonate solution usually causes a distinct turbidity, which should disappear when the solution is diluted, giving a clear liquid for titration. If, as rarely happens, a faint turbidity remains, a duplicate of the solution to be titrated is prepared, the end point being shown by the increased cloudiness in the titrated solution as compared with the blank solution.

8. DETERMINATION OF THE TOTAL SIMPLE CYANIDES IN SOLUTION.

To 10 c.c. of the mill solution add 10 c.c. of half-normal sodium hydrate solution (20 grammes of NaOH per liter), dilute to 65 or 70 c.c.; add a few drops of the potassium iodide solution, and titrate to pale yellow opalescence, as in Test 6. The result is the total KCN, HCN and $K_2Zn(CN)_4$, in terms of KCN. The amount of sodium hydrate to be added depends principally on the percentage of $K_2Zn(CN)_4$ present, as a large excess should be avoided. The amount given will be sufficient for solutions containing 0.7 per cent zinc and 0.4 per cent hydrocyanic acid, and will answer in all ordinary cases likely to be encountered in mill practice. The addition of the sodium hydrate produces a permanent precipitate, but the use of potassium iodide as an indicator prevents any doubt as to the end reaction.

9. DETERMINATION OF THE FERRO, THE FERRI AND THE SULPHOCYANIDES IN SOLUTION.

The ferrocyanides and the sulphocyanides, if desired, may be determined by titration with a standard solution of potassium permanganate in an acid solution, the reactions being as follows:

$$10K_4FeCy_6+K_2Mn_2O_8+8H_2SO_4=10K_3FeCy_6+6K_2SO_4+2MnSO_4+8H_2O.$$

$$10KCyS+6K_2Mn_2O_8+13H_2SO_4=11K_2SO_4+12MnSO_4+10HCy+8H_2O.$$

One portion, acidified with sulphuric acid, is titrated, the result representing both the above compound cyanides. To a second portion, acidified with sulphuric acid, a solution of ferric chloride is added. The resulting prussian blue is filtered off and the filtrate is titrated with the standard permanganate solution. This second titration gives the potassium sulphocyanide.

The permanganate solution should be quite dilute, containing not more than from 0.3 to 0.5 grammes of potassium permanganate to the liter. It may be standardized by any of the approved methods, and its value may be calculated for the compound cyanides according to the above equations.

*Transactions Am. Inst. M. E., September. 1896.

Ferricyanide, if present, may be determined by reducing it to ferrocyanide, and then by titration with standard potassium permanganate as above.

Should sulphides be present, the shaking up of the solution with moist lead carbonate will produce a black precipitate of lead sulphide. When present they must be thus removed, by agitation with lead carbonate and filtering off the resulting lead sulphide, before the compound cyanides can be determined.

10. DETERMINATION OF THE ZINC AND LIME IN SOLUTION.

As these are sometimes of considerable importance, they have to be occasionally determined in the mill solutions. The solution is treated in the manner described in Test 4, and the lime and zinc can then be determined by conventional methods.

11. DETERMINATION OF THE GOLD AND SILVER IN SOLUTION.

Numerous methods have been proposed, but the following which is the simplest is the method generally adopted:

Evaporate one assay ton (=29.2 c.c.) of the solution to dryness in a lead tray. Roll up the lead and cupel on a hot cupel, weighing the resulting button. Alloy the bead with silver, if necessary, and part for gold as usual.

Should the solution contain over 0.2 ounce of gold per ton, the lead should be scorified together with a little borax glass prior to cupellation.

The lead tray is made of pure lead foil, and is 3 inches long, 2 inches wide and ½ inch deep. It should weigh about 20 grammes. For the evaporation, the tray containing the solution is placed on a piece of asbestos cardboard, heated by a burner underneath.

In conclusion, the author wishes to express his indebtedness to Mr. Philip Argall, manager, and Mr. L. G. Eakins, chemist, of the Metallic Extraction Company, and to Mr. William Orr, chemist of the Gold and Silver Extraction Company of America, for valuable notes which have been largely used in the preparation of this paper. Acknowledgement is also due to the courtesy of Messrs. John Wiley and Sons, who have kindly permitted the use of considerable material contained in the fourth edition of the author's "Manual of Practical Assaying."

POSTSCRIPT.

1. Mr. George A. Packard has kindly called my attention to the fact that the formula given in my paper for determining the percentage of extraction applies only when the weight of pulp used and the weight of solution are equal. To make the formula universally applicable, it should be amended to read as follows:

Percentage of extraction=

$$\text{Assay of solution}\times\frac{\text{weight of solution}}{\text{weight of pulp}}\times 100.$$

$$\text{Assay of solution}\times\frac{\text{weight of solution}}{\text{weight of pulp}}+\text{assay of tailings}.$$

2. The equation—

The strong sulphuric acid at a high temperature decomposes the metallic cyanides thus:

$$2AgCN+3H_2SO_4+2H_2O=Ag_2SO_4+2NH_4HSO_4+2CO_2.$$

—should contain in the first member $4H_2O$ instead of $2H_2O$; and to the second member should be added $+4H$. The equation will then read:

$$2AgCN+3H_2SO_4+4H_2O=Ag_2SO_4+2NH_4HSO_4+2CO_2+4H.$$

This accounts for the liberation of hydrogen in the reaction with sulphuric acid.

3. In the equation showing the reactions with nitric and hydrochloric acids, the amount of hydrogen liberated should be 2H instead of H.

Africa's Small Yield.

From present indications the output of gold in the Rand, South Africa, for 1896 will not exceed, if, indeed, it equals, that of 1895. The output for October has been announced as 199,889 ounces. The output for September was 202,561, and for August 213,417. The increase from the beginning of the year up to the end of August had been so steady and large that it was generally anticipated that the year's total would exceed that of 1895, which was 2,277,640 ounces. To make up that amount this year the output for November and December must amount to 405,685 ounces.

There has been an increase in the milling capacity of the Rand, but the average of gold obtained per ton is less. To a large extent this is due, however, to the working of lower grade ore than would formerly pay. Upon this subject John Hays Hammond at the last meeting of the shareholders of the Consolidated Gold Fields, Limited, in London said:

"I have been asked to explain the decrease in the value of the ore per ton within the last few years, compared with the earlier history of the Rand. The facts of the case, briefly stated, are these: In the early history of the district, owing to the very high costs of operations then prevalent, and owing also to the small batteries then used, it was not possible to make any satisfactory profit from working other than the very highest grade ores—in other words, the mines were picked. We have the same rich ore bodies to-day as are shown in our assay plans at the lowest levels of our property. But the economical conditions have greatly improved since those days, and it is our object to work as low grade ore as possible, consistently with maintaining the required profits. You will appreciate the importance of this, because you will see that it not only enables us to work ore at a smaller cost, but adds materially to the life of the mine as well. I have pointed out to you in my last annual report, and frequently referred to the subject when I have had an opportunity of speaking upon the history and future of the Rand, that the ore occurs in broad patches, not in defined shoots, as in other gold-bearing formations, and that, therefore, we must appreciate the importance of having the development work well carried out in advance of the mill requirements; otherwise there is inevitable disappointment. The battery eats up, as miners call it, a tremendous quantity of ore, and it takes time to run your drives and open up ore reserves. We attribute the disappointments of many mining propositions on the Rand to the failure to adequately provide ore reserves as against the contingency of an occurrence of poor zones."

Notes on a Breathing Gas Well.

Written by HAROLD W. FAIRBANKS, Ph. D.

A very remarkable gas well recently came under the writer's observation while engaged in studying the geology of the Santa Lucia range. It is situated on the Eagle ranch, on the eastern side of the range in San Luis Obispo county, California.

The well is interesting on account of two things: (1), the presence of gas in the Golden Gate series, it being encountered while boring for water; and (2), the intermittent flow of gas, the periods of flow alternating with those of drawing in air.

The geology of this portion of the range is quite complicated. In the vicinity of the Eagle ranch there are four different formations; the oldest, the Golden Gate series, consisting of shale, sandstone and jasper, with numerous ancient eruptives, the whole being probably of Upper Jurassic age. The rocks of this series are extensively developed through the Coast Ranges of California, but have never before been found to contain gas, nor have any indications of coal or oil been met with.

The well was bored on the point of a hill rising perhaps 75 feet above a little flat on which the ranch buildings are situated; this flat is underlaid by Lower Cretaceous shales which surround the hill on three sides. The Chico sandstone occurs, overlying the shales in various places; while to the east, some distance away, the Bituminous Slate series (Miocene) is met with filling the Salinas valley. The Miocene is pre-eminently the oil and gas bearing formation of California. The writer does not know of any locality in the State where gas is obtained in quantities sufficient for use from beds of Cretaceous age, although such may be the case.

The well under consideration has a bore of six inches and was put down to a depth of 356 feet. The strata passed through consists of shale and sandstone having a very steep dip. They are exposed on the south side of the hill at a distance of a little more than a 100 feet from the well, and exhibit the intense distortion of and shearing so characteristic of the Golden Gate series. When first bored, the water rose to within 85 feet of the surface. A small amount of gas was encountered at a depth of 90 feet. Comparatively little gas came from the well at first, but during a stormy spell the well was pumped continuously for some time, and as the water grew lower a noticeable amount of gas began to issue. This increased until it was estimated to amount to 20,000 feet per day. This state of things lasted for about six weeks, when the volume began to decrease, finally becoming intermittent. The well has now been opened for four years, the gas continuing to average about 250 per day. During settled weather the intermittent action is fairly regular, the gas issuing for about three hours, when, an equilibrium being reached, the current changes and air is sucked in for the same length of time. If the air is not allowed to enter the gas will not flow; consequently an automatic valve has been placed at the surface of the well, permitting the ingress of the air. The suction is frequently so strong that, if only a small opening is left a roaring sound is produced, which is audible at the ranch house. The gas issues also with a strong pressure. The amount of water in the well does not affect the flow of gas in any manner.

Whatever the cause of the intermittent action it is influenced by the varying pressure of the air, for before a storm, when the barometer is falling, the gas continues to issue for a much longer period, sometimes for twenty-four hours, and when the rise in the barometer takes place there is the same prolongation of the period of inhalation. During high barometric conditions the equilibrium may continue for some time. The well at the present time produces four to five thousand gallons of water per month, being pumped on an average about every two weeks.

The locality is about twelve miles from the sea in a direct line, and has an elevation of 1,300 feet, so that it would seem impossible that tidal action could have anything to do with the phenomenon. During a talk with Mr. Benton, the superintendent of the ranch, who has closely watched the well, he stated that he had noticed no connection between the respiration and any physical conditions save the one referred to. The gas is used in all the ranch buildings, but is of such a character that with the ordinary burner it does not give a good light, consequently an incandescent burner is used.

The question of the source of the gas is rather a puzzling one. It hardly seems possible that it can be derived from the strata penetrated, and if not it must have its source in the surrounding Cretaceous shales, or possibly in the white Miocene shales, which here, as nearly everywhere else, are filled with animal remains. A well was sunk to a depth of 900 feet in the same area of Cretaceous shales about two miles to the west, but without encountering water or gas. If derived from the Miocene shales the gas must circulate through the rock for nearly three-fourths of a mile at least. The water is very pure, containing no alkali or trace of oil such as might be expected if it has passed through Miocene strata.

As to the cause of the intermittent action no reasonable explanation has occurred to the writer, and it is left for physicists to explain. It is certainly not due to any of the connections on the surface, for the facts stated were observed prior to such connections.

The Greatest Gold Belt.

The New York correspondent of the London *Mining Journal* settles this question in an off-hand way and readily gives the palm to the Mother Lode of California. He says in the issue of Nov. 14th: "We are not disposed to readily yield the palm to your South Africa as a gold-producing country. We have a weakness, as you know, for "whipping all creation," and, like your own army, we don't and won't know when we're beaten. Accordingly, we are not taken aback by the tale our United States Geological Survey expert, Dr. Becker, has just brought to us as one of the results of his recent extended study of the Transvaal region. He there met an American who was formerly his assistant in the Survey, and who is now engaged in mining in the Transvaal, where he has made several millions of dollars. This authority says that, to the best of his knowledge and belief, the gold belt, instead of being 30 miles long—the region now in sight—is practically 1200 miles long. The odd 1170 miles are, however, covered by later geologic deposits which have covered the gold formation. But he thinks this circumstance will merely delay instead of proving a bar to ultimate exploitation. Dr. Becker also reports that within fifteen miles of Johannesburg, on what is called the main reef series, there is an amount of gold, practically in sight, estimated to be worth $3,500,000,000; so that if the remainder of the belt be of similar productivity, the great gold question is not much of a question after all.

"But where do we come in, compared with this traveler's tale? Pray give me leave to tell you. We have in California a great gold belt named the Mother Lode, to which I have at various times referred in this correspondence. It is already well known for a length of 110 miles, reaching from the lower end of Mariposa county on the southeast to the upper extremity of El Dorado county on the northwest. A very conservative estimate by one of our leading authorities was published in the papers here some months ago and gave $6,000,000,000 as the amount of gold "practically in sight" along the 110 miles. The same authority says that, to the best of his knowledge and belief, the granitic mass which has usually been regarded as the southern extremity of the Mother Lode is but a local intrusion of moderate width. He thinks the gold belt has been merely displaced, and comes in again somewhat to the west of its normal trend, continuing on through southern California right to the Mexican frontier. He also considers that it extends north of El Dorado county, under the surface lava beds, through the remainder of California, and then on, across Oregon and Washington, to the Canadian frontier. If these views be correct (and there exist very many observed facts to support them), our Mother Lode is a gold belt having a length of, roughly, 1200 miles within our own domain, and extending far into the lands of our northern and southern neighbors. It need not fear comparison with the South African formation.

"This aspect of the case is of practical importance, because a study of the problems involved has recently led to the commencement of operations having for their object the discovery and working of the gold deposits beneath the lava beds in the northern counties of California. The progress of this work should receive the careful attention of all engineers and capitalists interested in gold production. Not only will a continuation of the auriferous quartz veins of the Mother Lode be in all probability found, but it is in the highest degree likely that ancient gravels will be encountered comparable in richness with those that in mid-California yielded the abundant golden harvests of 1849 and the early 50's. The first decided "strike" will inaugurate a period of adventurous enthusiasm, but the difference, as compared with 1849, will be that the individual digger cannot operate, and must be replaced by joint-stock corporations possessing considerable capital."

The Smuggler-Union Mines, Telluride, Colorado.*

By J. A. PORTER, Denver, Col.

(*Condensed.*)

The Smuggler-Union mines are located at the head of the San Miguel river, just south of the watershed between Ouray and Telluride.

The geology of the district near Telluride, and as far south as Mount Wilson, is now receiving the attention of the United States Geological Survey, Mr. Whitman Cross and party having spent several months of the past summer in this field work. In advance of the government report, Mr. Cross has kindly prepared a paper for the Colorado Scientific Society, which enables me to quote a page, which briefly describes the formation in which the Smuggler vein occurs. The Sheridan mine referred to by him adjoins the Smuggler, and is one of the properties worked by the Smuggler Company:

"I have especially described the San Miguel conglomerate, a sedimentary deposit of much interest, lying immediately beneath the volcanic rocks of the region; and while containing little volcanic material among its pebbles, it is clear that the San Miguel formation belongs to the general period which witnessed the beginning of the volcanic outburst in southwestern Colorado. The San Miguel conglomerate forms very conspicuous cliffs on both sides of the San Miguel river above Telluride. Upon it rests a stratified and, as I now believe, waterlaid series of volcanic tuffs and breccias, constituting the lower member of the volcanic complex. This bedded formation, consisting almost entirely of andesitic debris, has a thickness varying from a little more than 1000 feet to somewhat more than 2000 feet. Its lower limit is seen on the trail leading up Marshall creek, at an elevation of 9800 feet, and it extends to the level of the Sheridan mine in Marshall basin at an elevation of nearly 12,000 feet. As the beds have a gentle dip, it appears that the thickness of the formation in this section cannot be less than 2000 feet.

"It is proposed to call this stratified series of andesitic tuffs and breccias the San Juan formation, as it clearly plays an important part in the make-up of a large portion of the San Juan mountains. The texture of the San Juan beds varies from a thin-bedded, fine-grained tuff, containing no large fragments, to a tuff-breccia, consisting of large, subangular blocks imbedded in a finer grained matrix. The proportion of large fragments varies a great deal, but I have not seen the formation to be made up of large fragments exclusively at any point, although where it is indurated in proximity to some of the large diorite stocks, and in near mineralized areas, it has the appearance of a massive breccia. The upper limit of the San Juan formation may not be always clearly definable. In the mountains about Marshall basin it is, however, very sharply defined by the appearance of the first massive lava flow of augite andesite."

The Smuggler vein is remarkable for its continuity and regularity. It crosses the watershed of Canyon creek, a tributary of the Uncompahgre, and Marshall creek, which runs into the San Miguel at Pandora, at an altitude of 13,200 feet, at which point the thickness of the rocks of igneous origin might be roughly estimated at 3500 feet, since Marshall creek exposes the underlying conglomerate in nearly horizontal position at an altitude slightly less than 10,000 feet. The vein is plainly visible upon the surface, where it crosses the divide, and cuts through the rhyolite and augite andesite down into the andesite breccia to within only a few hundred feet above the conglomerate, as it crosses Marshall creek. What the character of the vein may be after passing into the conglomerate and sandstone is not yet determined. It will be many years before any of the mines of Marshall basin reach the horizon of the conglomerate.

Only two cross-faults occur in the entire length exposed by underground workings. The first is at a point near the south end of the property, and is caused by a large quartz vein—the Pandora—containing gold, but little or no silver. It dips 45° to the south. The plane of fault is nearly at right angles to the course of the Smuggler vein, and the movement of this fault, is about fifty feet. The second fault of only a few feet is made by the Revenue vein, which crosses the Smuggler vein at an angle of about 15°, and is as well defined as the latter. This vein is now being developed, and is very easily worked, owing to the decomposed state of the ores it contains. It carries less gold and more lead than the main vein. The deep tunnel follows this vein for some distance, as a matter of economy in reaching the shaft.

The Smuggler vein is probably a fault fissure. Both the hanging and the foot wall show large polished surfaces. Striation is very frequent, and gouge matter, several inches in thickness, occurs in places upon the hanging as well as the foot wall. Yet, although this is largely the case, long distances occur where the quartz, which almost exclusively forms the filling of the vein, shows no parting whatever from the country rock. To use a miner's expression, it is frozen to the walls.

The average thickness of the vein is about five feet, seldom narrowing to less than two feet, and rarely widening to as much as ten. Enclosures of country rock are frequent, sometimes as fragments, and more frequently in continuous masses between bands of the lode. Cavities are rare; and no such structure occurs as is seen in some veins where corresponding minerals are found at each wall, and others succeed in conformable layers towards the center. In the Mendota claim a mass of andesite several hundred feet in length and 30 or 40 feet in thickness divides the vein; or, as usually expressed, the lode forks and comes together again in several hundred feet. This is the only point in the workings where such an occurrence is met with, except on an exceedingly small scale, when a stringer leaves the vein for a few feet only. Associated with quartz, rhodocrosite occurs in places and imparts a pinkish color to certain bands in the vein, which are sometimes nearly a foot in thickness and very regular for many yards. When this mineral is present in sufficient quantity to color the vein, that portion is seldom rich in the precious metals. Very small quantities of calcite, brownspar and heavy spar also occur.

The minerals occurring are pyrite, chalcopyrite, galenite, sphalerite and the arsenical silver minerals. Proustite and polybasite have been determined, and probably nearly all of the arsenical silver minerals occur. No specimens of tetrahedrite have been recognized. Metallic silver is very rarely encountered. Metallic gold is more frequent, although unusual. The remarkable feature of the vein is the regular and continuous distribution of the ore, which generally lies near the footwall. The usual occurrence is a few inches of richer ore (so-called "shipping ore") and a foot or two of banded structure, more available for concentrating, which goes to the mill. So constant is the occurrence that over a mile has been worked along the vein on various levels without meeting any part where the ore is not present in sufficient quantity for continuous stoping. One remarkable feature is the constant increase of gold value toward the south, throughout the entire workings, and the corresponding decrease in silver value in same direction. Where the vein crosses the divide, at the extreme north end of the property, the gold value is hardly one-quarter that of the silver. The transition from silver to gold is almost constant until, a mile south, the vein practically becomes a gold lode. This change does not correspond to depth gained by slope of mountain toward the south end of the property; for on the north side, at a corresponding altitude, the vein contains gold to the extent of only a few per cent of its total value.

An important change has recently been introduced in the construction of the chutes, which has made it possible to use them in spite of the passage of heavy and sharp rock until a height of even 250 feet has been attained, thus saving the great expense of running and timbering drifts at every hundred feet. The levels will in future be 200 feet and more apart. The change in construction is locally a new departure, and consists in simply placing the timbers used in building of chutes (mills) so that the end will be cut into, instead of the sides, which are soon cut out. The old "mills" were built like a log-house; the new are constructed of short mill timbers, and for the first hundred feet are built with ends presented to the falling rock.

*Trans. Am. Inst. M. E., September, 1896.

IN an article on "Gold Mining in British Guiana," a correspondent of the London *Mining World* says: "As a conclusion, then, we are inclined to the belief that with free-milling gold of a high grade of value, such as is reported to prevail in the northwest district of British Guiana, and moderate working expenses, the cautious investor will not be going too far to assume that the elements of success are contained in the British Guiana gold fields, of course with dependence upon able and competent management, and that these gold fields which have been in men's mouths from the days of Sir Walter Raleigh and Queen Elizabeth may some day rival in popularity the world-famed fields of Victoria and South Africa. At any rate, as the result will tend to the success of British Guiana as a colony of the British Crown, it is a consummation that may at least claim our sympathies and interest."

THE Illinois Steel Company has ordered 30,000 tons of manganese ore from mines at Leadville, Col., to be shipped to Chicago and Joliet as fast as the mineral can be mined. The amount of money involved in the deal is from $600,000 to $1,000,000.

Scientific Progress.

Waste Made Valuable.

The value of the efforts made of late years to utilize culm heaps was shown by N. W. Perry in a paper read before the Anthracite Coal Operators' Association, in which he said:

"The problem of preventing the waste of the product of your mines is one that you have labored with for years, and how well you have solved it is shown from the fact that whereas in one district (the Panther Creek basin) from the commencement of mining in 1820 to 1883, it was estimated by Mr. Ashburner that 20 per cent more of the coal mined had gone to the dirt bank than had been marketed, during the two years, 1881 to 1883, the amount of coal going to the dirt bank was but 52 per cent, and at the present time conservative statisticians figure that 20 per cent is a fair figure for the culm bank waste in the anthracite regions.

"The Pennsylvania Coal Waste Commission estimated that from the commencement of mining up to 1892, the coal and dirt sent to the culm bank averaged about 35 per cent of the total production, or about 315,700,000 tons. To this is being added about 20 per cent of a largely increased annual yield —a drain upon your resources and an item of large expense. This annual flow of fuel, amounting to more than 100,000 horse power each year, for which the more marketable article has already paid tribute—is at present a cumberer of the ground, and for this reason an additional tax upon your resources.

"The most significant indication of the progress of engineering science is the rapid increase in directions in which hitherto waste products are being turned to account, and it is to one of these directions that I would direct your attention.

"In the history of our early gold and silver mining, we find the counterpart of the culm banks of to-day. Material thrown away then produced fortunes for those who came after, and the tailings from the gold and silver mines were made to yield their precious metals at a profit. So we, to-day, are casting about to find some means of forcing the culm piles to yield in an available form their still more precious burden—the energy of the sun stored up by nature."

Uncle Sam's Guns.

Secretary Lamont in his report says that July 1, 1893, but one high-pressure gun was mounted for coast defense. By the 1st of July next we will have in position seventy high-power breech-loading guns and ninety-five breech-loading mortars of modern design, and by the following July, on completion of work already under way or provided for, 128 guns and 153 mortars. The battery of two or three of these guns takes the place of the former pretentious fort and is vastly more effective. An 8-inch gun weighs 14½ tons, is 23½ feet long, requires a powder charge of 125 pounds and throws a projectile weighing 300 pounds about nine miles. A 10-inch gun weighs 30 tons, is 30½ feet long, requires a powder charge of 250 pounds and throws a projectile of 585 pounds about twelve miles. A 12-inch gun weighs 57 tons, is 40 feet long, requires a powder charge of 520 pounds and throws a 1000-pound projectile thirteen miles. A 12-inch mortar weighs 29,120 pounds, is 13 feet long, requires a powder charge of 105 pounds and throws a filled projectile weighing 800 pounds over five miles.

The defenses now under consideration are distributed among the ports of Portland, Me., Portsmouth, N. H., Boston, Narragansett bay, eastern entrance to Long Island sound, eastern and southern entrances to New York, Philadelphia, Baltimore, Washington, Hampton Roads, Wilmington, Charleston, Savannah, Key West, Pensacola, Mobile, New Orleans, Galveston, San Diego, San Francisco, the mouth of the Columbia river and Puget sound. All of the emplacements have been located with a view of carrying on the project of the Endicott Board of Fortifications, organized under the act of Congress of March 3, 1885, as revised by the permanent Board of Engineers.

By next July there should be completed fourteen 12-inch, forty-six 10-inch, ten 8-inch and twelve rapid-fire guns and 112 mortar emplacements. And by the close of the coming year this will be increased to twenty-one 12-inch, sixty-six 10-inch, twenty-five 8-inch and sixteen rapid-fire guns and 156 mortar emplacements.

The total amount appropriated for sea-coast defenses, including cost of sites, fortifications and armament, since the adoption of the present scheme, is $25,457,000, of which more than one-third was carried by the act passed at the last session of Congress.

Mechanical Progress.

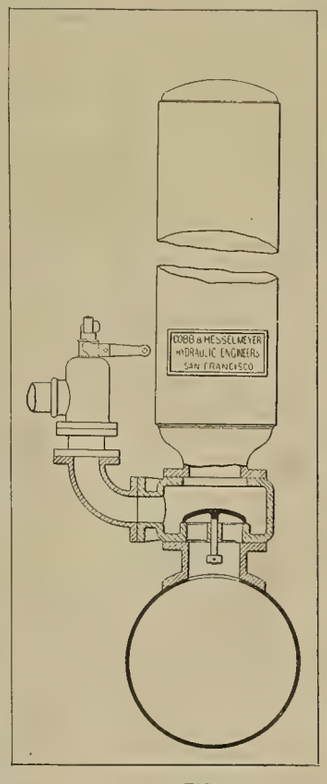
Water Ram in Pipes.

The apparatus herewith illustrated has been designed by Messrs. Cobb & Hesselmeyer, hydraulic engineers of this city, to use in connection with pipe lines conveying water for power or other uses to prevent fluctuations of pressure, which occur in such lines when the flow of water is suddenly checked or changed.

The apparatus embodies the elastic air chamber to receive and absorb the shock, and it is intended that the reaction of the air compressed above normal be prevented by introducing an automatic stop valve between air chamber and pipe line, as shown.

The water which enters the air chamber during the compression of the air therein is discharged through a suitable waste valve at the side. This valve being opened by the excess of pressure above normal, that was entrapped in the air chamber, and closes automatically when the water discharging from the air chamber has reduced the pressure therein down to normal conditions.

In Fig. 1 is shown a simple form of the apparatus, which, in addition to



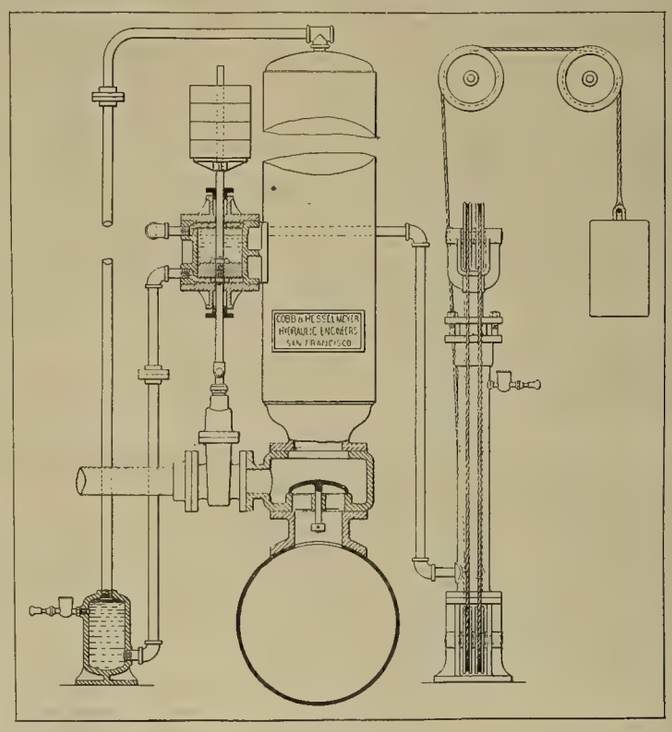
PATENT APPLIED FOR. FIG. 1.

the air chamber usually found on the line, consists of a valve chamber containing a check valve and having an outlet, the discharge from which is controlled by a pop safety valve. If water is flowing in the pipe line under normal conditions, the pressures in the line, valve chamber and air chamber are all equal, and the check valve shown is in exact balance, while the pop valve is set so that it can just resist that pressure without blowing off. If, now, from any cause, a water ram should occur in the pipe line, water will immediately rush through the check valve into the air chamber, compressing the air therein above its normal pressure and at the same time causing the pop valve to discharge.

The elasticity of the air cannot cause a rebound of water into the pipe line because of the check valve, and the increased pressure in the air chamber will cause the pop valve to remain open until sufficient water has been discharged therefrom to reduce the pressure in the air chamber to normal pressure, when the pop valve will close and the check valve be again in balance, the quantity of water wasted being exactly proportional to the energy of the ram overcome.

The sensitiveness of this form of apparatus is dependent upon the limits of pressure required to operate the pop valve, which are as low as possible under these conditions, because the excess pressure of the air chamber is not fluctuating.

Fig. 2 illustrates a more elaborate



PATENT APPLIED FOR. FIG. 2.

form of apparatus that can be arranged to be sensitive to a very small increase of pressure in the air chamber. A double-face discharge valve is shown operated by an hydraulic cylinder, but a balanced piston valve would be preferable under some conditions.

The piston of the hydraulic cylinder receives on its lower face the pressure of the air chamber and on its upper face a constant pressure equal to the normal working pressure of the pipe line. By proportioning the diameter of the working piston to the work to be done in operating the discharge valve in connection with the allowable increase of pressure in the air chamber, the desired degree of sensitiveness may be attained.

Electrical Progress.

DEMONSTRATIONS have been given lately by Lawson Tait in London of his electric hæmostat, an instrument which, as the name denotes, is intended for the arrest of bleeding in surgical operations. A platinum wire, arranged to carry a current, is inclosed in the blades of a pair of steel forceps, or any other requisite instrument, the wire being isolated by a bed of burnt pipe clay. A current of suitable voltage is turned on, the artery seized and compressed, and in a few seconds the tissues and arterial walls are so agglutinated that the passage of blood is rendered impossible. The temperature employed is about 180° F., so that it will be seen that the principle is fundamentally different from that of electrical cauterizing instruments. It is stated, says the *Electrical Engineer*, that by Tait's instrument the necessity for a ligature is removed, and a new and completely effective method is placed in the hands of the surgeon for the treatment of surface oozing.

A PROPOSAL is being discussed for supplying the Hauraki gold fields in New Zealand with electric power, to be obtained from the Huka falls of the Waikato river, near Lake Taupo, distant about eighty miles from Te Aroha, on the southern fringe of the gold mining area, and about 160 miles from the outermost point of the gold area at Cape Colville. The power would be transmitted over a "rugged and trackless mountain region," on wires "hung from point to peak, spanning its ravines, festooned around its crags, and carrying light and movement down to the bottom of its deepest mines." The water that passes over the Huka falls, it is added, "is in volume and gravitation equal to all requirements, and, so far as can be drawn from experience of enterprise elsewhere in the transmission of electrical energy, the scheme of giving motive power to all the batteries likely to be founded on the Coromandel peninsula seems entirely feasible."

THE decision of the Japanese Government to appropriate about $60,000,000 during the next seven years for the expansion of the telephone service will give that country the best system in the world. The work of construction is being rapidly carried out at various important places, the intention being to complete by March, 1898, the expansion of the service relating to Tokio, Osaka, Yokohama, as well as the new constructive work in Nagoya, Nagasaki and Shimonoseki, and to establish a telephonic connection between Tokio and Kobe.

AN electric railway for passengers is proposed for Mont Blanc. Up to a certain altitude it would be upon an inclined plane, and the ascent would be completed by a vertical shaft of a depth of 2539 meters, through which powerful electrical lifts would convey the passenger to the observatory on the summit.

AT the recent meeting of the British Association for the Advancement of Science, Prof. S. P. Thompson suggested that X rays may be the ordi-

nary means of optical communication among fire flies, and that, for that reason, Providence had not found it necessary to furnish the insect's eyes with a lens.

Practical Information.

The Amount of Water in the Earth's Crust.

W. B. Greenlee, in the *American Geologist*, writing on this subject, says:

Assuming that the earth is saturated with water to the depth of one mile, we have next to determine the relative amounts of its constituent rocks and their respective porosities.

The surface of the earth may be divided into two divisions—first, that covered with sedimentary rocks and, second, that covered with igneous and metamorphic rocks. To ascertain the relative areas, the United States and Europe were selected as typical of the land surface. The results showed that 31.2 per cent of the surface of the United States is covered with igneous and metamorphic rocks.

In Europe each country was separately divided and the percentage of the respective sums taken. This proved to be 19.8 per cent. An average of these results, by coincidence, is 25.5 cent, or, roughly speaking, three-fourths of the land surface of the earth is covered with sedimentary rocks having an average thickness of one mile.

The most accurate determination of the porosities of rocks has been made by Prof. Bauschinger of Munich. He found the average porosity of upward of 300 specimens of sandstones and limestones to be 20 per cent of their volumes. Two per cent may be taken as a low average for igneous and metamorphic rocks.

The most recent and careful computation of the respective areas of sea and land on the earth's surface is that by M. Thoulet in his "Oceanographie." This he gives as 368,000,000 kilogrammes for the sea and 142,000,000 kilogrammes for the land; or, reduced to square miles, 142,084,860 and 54,826,200 respectively. Three-fourths of the land is 41,119,650 square miles and one-fourth 13,706,550 square miles. Taking 20 per cent of the former and 2 per cent of the latter, and adding, we get 8,498,061 cubic miles of water.

Thoulet estimates the volume of the oceans at 1,347,874,850 cubic kilometres, which, reduced to English measure, equals 318,191,728 cubic miles.

The estimated amount of mechanically contained water in a section of a mile over that part of the earth's crust covered by land is thus 2.7 per cent of the water now on the earth's surface, or a layer 88 feet deep over its entire surface.

There is undoubtedly a large amount of water below one mile, but we can only conjecture as to the amount, nor does this estimate include that chemically contained. No estimate was made of the amount of water beneath the bed of the ocean, as we have no way of knowing of what it is composed or how thick the permeable layer is. This, too, would increase the total.

New Small Coins.

Within the next few months the material used in making several of our smaller coins may be changed. Congress recently directed the Secretary of the Treasury to make experiments with several new metals with a view to changing those now in use. These experiments are now about completed, and the result of them will be presented to the next Congress.

Of all the countless possible alloys to be obtained from copper, tin, nickel, and aluminum, in different combinations, perhaps fifteen or twenty may be found fairly satisfactory. It is possible that one or two of these may advantageously be brought into use for general coinage.

Aluminum, which has never yet found a place in the currency of any nation, is to be worked up into trial coins. It is also to be given a chance in new alloys. Aluminum is a metal of which but little has been known until recently, and it has been found useful in so many ways that a sort of popular idea prevails that it would be good for coins. Chief among its advantages would be its very light weight. Cents made of it could readily be distinguished from coins of the same size by this remarkable lightness alone.

The experiments at the Mint will include different combinations of nickel, copper and zinc, forming the alloys known under the head of German silver; copper and tin, which produce bronze; aluminum and copper, which make aluminum bronze. German silver has been used for coins by one of the small South American States, and proved fairly adapted for the purpose. Bronze is commonly used for coins of small value. It is doubtful if aluminum bronze in any form will be found acceptable, as it is hard to work and has a yellow, brassy appearance, resembling gold, which is to be avoided in all coins of small denominations.

It is commonly estimated that green wood, when cut down, contains about 45 per cent of its weight in moisture, but in some cases wood cut down in winter is said to hold more than 40 per cent of water at the end of the following summer. Kept for several years in a dry place, wood retains from 15 to 20 per cent of water, while that which has been thoroughly desiccated will, when exposed to air under ordinary circumstances, absorb 5 per cent of water in the first three days, and will continue to absorb it until it reaches from 14 to 16 per cent as a normal standard — the amount fluctuating above and below this standard, according to the state of the atmosphere. It has been found that, by exposing green wood to a temperature of 212° F., the loss of weight equaled 45 per cent; and, further, on exposing small prisms of wood ½ inch square and 8 inches long, cut out of billets that had been stored for two years, to the action of superheated steam for two hours, their loss of weight was found to be from 15 to 45 per cent, according to the temperature of the steam.

President Zelaya has decided to grant a charter for a railroad from Lake Nicaragua to the Caribbean sea, a distance of about seventy miles, to two citizens of New York. This road will run north of the route of the Maritime canal of Nicaragua, and is looked upon as certain to lead to a prompt development of the interior of the Republic, and should be of considerable assistance in the work of building the interoceanic waterway.

There are 119,000,000 old copper pennies somewhere. Nobody knows what has become of them, except once in a while a single specimen turns up in change. A few years ago 4,500,000 bronze two-cent pieces were set afloat. Three millions of these are still outstanding. Three million three-cent nickel pieces are scattered over the United States, but it is very rarely that one is seen.

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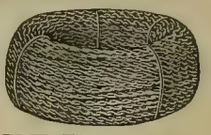
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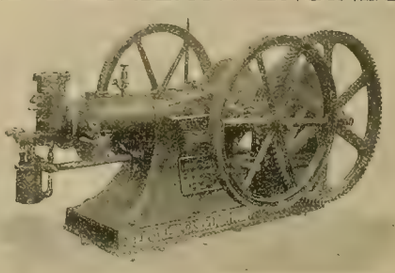

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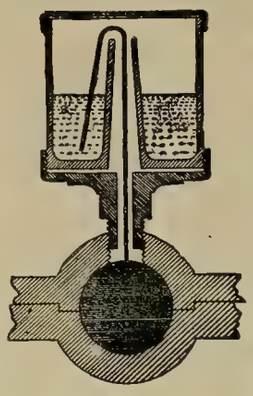

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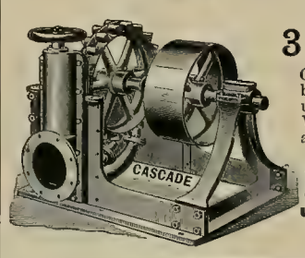

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Coast Industrial Notes.

—Last week the new steamer Humboldt was launched at Eureka.

It is proposed to start up again the terra cotta works at Elsinore, Los Angeles county.

—A signal service station has been located in San Jose by the Department of Agriculture.

A carload of fine horses is to be shipped from Santa Barbara to the city of Mexico for sale.

The California Powder Company is putting a $300,000 addition to its Santa Cruz works.

—During November San Francisco corporations paid a total of $393,964 in dividends, against $296,406 for the same month in 1895.

A number of irrigation districts in the southern part of the State propose to make a fight for the annulment of the bonds issued on the ground of irregularity in the organization.

It will probably be agreed by the Alameda county Board of Supervisors and the Southern Pacific Company to join in building a steel bridge across the estuary for trains and other travel.

—Over half the business portion of the town of Leavenworth, on the Great Northern road, in Okanogan county, Washington, was destroyed by fire last week. The loss was about $50,000.

—The California Beet Sugar Estate and Land Company, the English company owning the Chino ranch, have issued bonds amounting to $750,000, secured by a trust deed to their property. It is intended to enlarge the present plant and otherwise improve the property.

—Last week the seaport towns of southern California experienced remarkably stiff gales from the northeast for forty-eight hours, which in many instances caused considerable damage to local shipping interests. Nearly all the wharves south of Point Conception were more or less injured.

—What is believed to be the first sawmill in the world run by directly-transmitted electricity began work this week at the sawmill of the American River Land & Lumber Co., Folsom, Cal. Everything in and about the mill is run by electricity. The mill has a daily capacity of 120 M feet.

—By virtue of first mortgage bondholders' proceedings the Seattle Consolidated Street Railway, consisting of about thirty-five miles of electric railway has been sold to Judge Thomas Burke, representing the bondholders, for $139,601. There was a total indebtedness of about $600,000 against the property.

—A proposition has been made in the Chamber of Commerce of San Diego looking toward the establishment of a small steamer line between San Pedro and San Diego. The object is to afford competition against the Southern California Railway, which is alleged to discriminate against San Diego in the matter of tourist travel during the winter months, when it is heaviest.

—At Los Angeles the building operations of the year to December 1st aggregated $2,748,005 in value as compared to $3,885,883 last year. No public buildings of any sort are embraced in the record. More attention has been paid during the year to dwellings and homes than to business blocks. The total number of permits, exclusive of those in November, is 2163, as against 2415 issued last year.

—A Tacoma syndicate which about five years ago acquired valuable coal properties five miles south of Hamilton, in Skagit county, Wash., have been quietly developing the mines since that time, intending to erect a coke-making plant when times improved. They now propose to go ahead. Arrangements are being made to build a six-mile flume from the mines to a point on the Skagit river several miles below Hamilton, where coke ovens will be constructed. Running the coal through the flume will thoroughly wash it, thus saving expense for that process.

—An estimate of the orange crop for the coming season, procured by the freight departments of the Southern Pacific and Southern California Railroads, would indicate that the shipments will greatly exceed those of any preceding season in the State's history. The estimate is 8375 cars, of which 2700 are in Riverside, 1800 in Los Angeles and vicinity, and the remainder in the outlying districts. It is stated that the crop will come fully up to this estimate unless adverse climatic conditions ensue. The crop last season aggregated 7000 carloads. The estimate for the coming season means 2,512,500 boxes.

—The State Highway Commissioners in their report state that the expenditures on roads throughout the State for 1894 and 1895 were $1,789,259.64, and for the period from 1885 to 1895, inclusive, the amount was $17,919,324.26. The natural conditions—climatic, geological and topographical—are all favorable to the construction of roads, though at the present time there are scarcely any permanently constructed highways in the State. The reason for this seems plain, for the work has been carried on without method or system, and money set aside for the purpose has been wastefully and injudiciously expended.

—Reports from sixteen of the leading export mills of Washington, as collected by the *West Coast and Puget Sound Lumberman*, show cargo shipments of 37,727,012 feet of lumber and 4,149,885 lath during the month of October, of which 14,494,547 feet of lumber and 83,650 lath went foreign, showing a gain of 4,000,000 from September, though foreign shipments were 5,000,000 feet less. The total cargo trade for ten months has reached 293,155,984 feet. Eastern shipments of lumber for October were 583 cars or 9,328,000 feet, a decrease of nearly 1,000,000 feet from October last year, though for ten months shipments have reached 43,168,000 feet, against 76,495,000 feet during the same period of 1895. To November 1st the total cargo and rail trade for the State aggregated 3,863,239,984 feet. October shingle shipments were 1,324 cars or 214,480,000 pieces, against 225,000,000 for the corresponding month last year, while the total for ten months has been 2,010,720,000, an increase of 110,000,000 as compared with the same months of 1895.

Personal.

M. J. FARRELL is the new superintendent of the Kate Hayes mine at Grass Valley, Cal., which is to be reopened.

THE British Home Secretary has ordered the release of Dr. Jameson, the South African raider, from Holloway jail on account of his health.

B. MCDONNELL, who has been acting superintendent of the Tuolumne mine in Amador county, has been appointed general superintendent.

HERMAN THOFEHRN, formerly manager of the Anaconda refinery in Butte, is about to go to China to secure copper mines for the Government.

T. A. RICKARD, State Geologist of Colorado, has been appointed consulting engineer of the Searls properties in the West, vice W. J. Clark, resigned.

D. B. HUNTLEY, superintendent of the De Lamar (Idaho) mine, has lately been visiting in his old home, Oakland. Mr. Huntley is a graduate of the College of Mines of the University of California.

LOUIS CHEVRILLON, who represents the North American Exploration Company of New York and Paris, and who has been looking at mines at Mercur, Utah, has come on to California in the interest of his company.

CAPT. AUGUSTUS F. RODGERS of the United States Coast and Geodetic Survey has returned from Washington and will proceed to Los Angeles to meet Admiral Walker and other members of the Deep-Sea Harbor Commission.

Commercial Paragraphs.

THE Pacific Mining Machinery Company has shipped a Pacific amalgamator to the M. M. & R. Co., Warrington, North Carolina, and one to the Arizona Mineral Development Company, Prescott, Arizona.

THE Union Gas Engine Co., 314 Howard street, San Francisco, received an order last week for two 20 H. P. gasoline engines, to be shipped with two air compressors to Mexico, to be used in mines owned by Boston parties.

THE Gates Iron Works, Chicago, Ill., have added another feature to their present extensive plant. It is only recently they have commenced to build high-grade 4-valve Fischer engines, and at this early day have a number of orders on hand, which means giving employment of more men.

THE date for holding the second annual convention of the National Association of Manufacturers has been fixed for the 26th, 27th and 28th of January, 1897, at Philadelphia, Pa. It is expected that this convention will be one of unusual interest, as the president will submit a report of the first full year of practical work in the lines mapped out by the original convention held in Cincinnati, January, 1895. This report will describe the initiation of practical movement in the direction of the cardinal principles originally adopted by the Association, and very gratifying success in various directions will be noted. It will then devolve upon the convention itself, which will embrace the recorded members holding certificates in the Association, to pass upon the work which has been done and to indicate a policy to be pursued by the president and executive committee during the next year, in which year it is confidently expected that existing conditions will enable the Association to make vigorous progress.

Recently Declared Mining Dividends.

Idaho, British Columbia, $20,000; payable Nov. 21.

Ontario, Utah; $15,000, payable Nov. 30th. Total to date, $13,355,000.

Swansea, Utah; $5000, a regular monthly dividend, payable Dec. 3rd.

Boston & Montana Company, Montana; $450,000, payable Nov. 20th.

Moulton Mining Company, Montana; $20,000, or 5 cents a share, payable Dec. 1st in New York.

Cariboo Mining, Milling and Smelting Company, British Columbia, $16,000; payable Dec. 7. This makes a total of $125,401.34 since Feb. 1895.

Recent California Mining Incorporations.

Little Hope Gold Mining Company; W. M. Hall, E. H. Muller, W. S. Miller, K. A. Hughson, G. E. Brinkerhoff, G. D. Gray, R. S. Moore.

Noche Buena Gold Mining and Milling Company, San Francisco; F. H. Prentiss, Chicago; S. Ephraim, T. J. Ryan, San Francisco; J. L. Field, R. A. Friedrich, Alameda; capital stock $1,000,000—$500 subscribed.

Obituary.

PETER VAN CLIEF, one of the Supreme Court Commissioners, died last Sunday in this city, aged 78 years. Judge Van Clief in 1858 was appointed by Governor Weller judge of the old Seventeenth district, including Plumas and Sierra counties. In the later seventies he took a leading part as counsel for the miners in the debris fights. He leaves a widow and three daughters.

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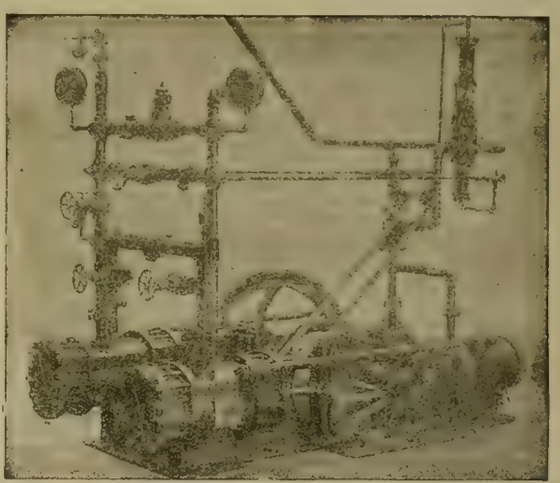

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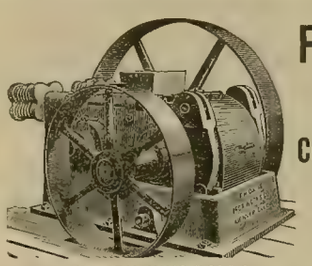

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Mining Summary.

CALIFORNIA.

Amador.

Ledger: The Bellwether Gold Mining Company has its shaft down 255 feet in depth and going down 50 feet per month.

The property at Irishtown worked by Robert Reed for Tautphaus & Stone of San Francisco is looking well, and the machinery recently put on the Belden mine by the same parties has been moved there.

Superintendent Peters of the Good Hope mine, at the edge of town, has put five stamps of his 10-stamp mill in operation. They commenced to drop Monday on fine ore.

Republican: Five of the ten stamps of the mill at the Good Hope have been started. The dump pile, which has been lying there for twenty years, is being passed through the mill. It consists of a mixture of quartz, slate and gouge. It can be crushed at trifling expense, and, if it yields from $2 to $3 per ton, can be milled at a profit. There is, perhaps, between 400 and 500 tons on the dump.

Calaveras.

Chronicle: The Gwin mine shaft is down 1445 feet. A station is being cut at the 1400-foot level. Work on the 1200 and 1300-foot levels will be continued until the mill is ready to run, which will be in about two weeks. A 120-light dynamo is being put in place for furnishing lights to the mine and mill.

A contract has been let by the California Exploration Company to Charles Rivara to run several hundred feet of a tunnel at the Gottschalk mine.

Prospect: Gulch miners are now making all necessary preparations for sluicing and ground sluicing. Some good-sized nuggets have already been found.

On the Western lode, near Campo Seco, the Jack Howard mine is said to have rock at present that will go $100 to the ton.

The Dean Brothers' mine, the McAfee, the Eproson, the Brown, the Donner, the Dolan, the Leader, the Anna, the Shiloah Pocket and the Slate Creek all show good milling ore.

The new shaft at the Utica will be three compartments, 8x17, or 5x14 in the clear, and will go down 2000 feet, intersecting a drift of the 1300-foot level. Its cost will be $30 a foot, or $60,000, and will insure ten years' prosperity for the camp.

The work of enlarging the shaft of the Lightner mine to a three-compartment shaft is going on night and day. As soon as the old shaft, which is less than 70 feet in depth, is enlarged to its full depth sinking will be commenced. The ore body is over 40 feet in width and, like the Utica and Stickles mines, the ledge widens as depth is attained. No work has been done on the Lightner property since 1857. The sulphurets, which contain the greater percentage of the gold, were then permitted to run off with the tailings.

The richest pay chutes discovered in the Utica and Stickles mines, it is expected, will be tapped in the Ghost mine at a depth of 1800 or 2000 feet, and it is the intention of the owners to put the shaft down deep enough to reach these chutes before opening up a general system of stoping.

Citizen: At the Quartz Glen mine, near Rich Gulch, Ferris & West have 17 men employed getting out quartz, and the 20-stamp mill is working on good milling ore. In the 800-foot tunnel a ledge of good ore 10 feet in width has been encountered 450 feet from the surface. The upraise from the 1000-foot tunnel, which is 450 feet above the tunnel mentioned before, has tapped the old Foote & Thompson works 160 feet above the level of the tunnel, and a large body of ore is to be seen the entire distance.

El Dorado.

Mountain Democrat: At Fairplay, at the Uncle Sam mine, a large amount of work has been done, and the report is that pay gravel has been struck.

At the Gardner & Morton mine, adjoining the Uncle Sam, they are taking out plenty of pay dirt.

T. Elliott, who has the Humphries quartz mine bonded, has let a contract for sinking 100 feet deeper.

Gazette: The Big Sandy is shut down to add more pipe to the lines and rig up for sinking again.

The Hard Scrabble is again shut down—this time for good.

Inyo.

Register: A strike has been made in the Mammoth mine. The vein has been cut for 20 feet and the wall is not found yet. Assays of the ore give over $100 per ton. Col. Judd has gone to Chicago. S. D. Crosscup will set up the concentrating plant.

The copper claims of Sanger & Danielson, near Saline Valley, are showing up in good shape and, it is claimed, show permanent value.

Smith & Best are taking out pay ore at the Molus mine.

Dr. Doyle of Chicago has completed negotiations for the purchase of the Wild Rose mining property, above Benton, from McNamara Bros. & Dowd. The purchase price is said to be $10,000.

R. J. Whittaker has finished a run of nineteen tons of ore from the Red Jacket, in Tule canyon, at Sam Piper's arrastra on Cottonwood creek. The returns were far in excess of expectations. The ore was hauled a distance of thirty miles.

Kern.

Californian: At Garlock the battery blocks and other timbers, as well as part of the machinery, are on the ground for the new 10-stamp mill.

They are starting a new tunnel in the Rand mine, also of the group, to connect with the others. There are several other mines in this group, employing in all over forty miners at $3 per day and the foreman at $3.50.

The Big Blue at Knoxville, which was extensively worked many years ago, is reported to have been sold and will be opened up soon.

The cyanide plant belonging to Dr. Marshall & Co., which is now located on the Mojave river, is to be removed to Garlock.

The Walkover, belonging to H. Watson, was bonded a few days ago to a company for $10,000. They will begin work at once developing.

The Olympus is down 100 feet, with 200 feet of a drift on the 50-foot level, and with a big body of ore above them, running from 6 feet to 25 feet in width.

The Yellow Aster, also belonging to the Burcham property, is in 200 feet on a level with a winze about 30 feet.

Mariposa.

Gazette: James Deatrich has bonded the Elizabeth and Mayflower mines of Barney Kane and proposes to develop them.

Nevada.

Union: An English syndicate is negotiating for the purchase of a group of quartz mines in Willow Valley district.

Telegraph: Farrell, Gambel and others have a bond on the Kate Hayes Hill mine and work will be commenced immediately. The shaft is considerably caved and the first work will be to put it in repair, and when that is done hoisting and pumping works will be placed on the mine and it will be thoroughly developed. The company who are to operate this property consist of foreign capitalists. The Kate Hayes is one of the early day mines of Grass Valley. It was worked in the sixties, the records showing that the ore paid on an average from $35 to $50 per ton. In 1866 work ceased for some unknown reason and nothing was done on it until a couple of years ago, when a local company cleaned out the shaft and got ready to open the mine, but their capital was too limited to sink.

Placer.

At the Occidental mine at Grizzy Flat, near Iowa Hill, Supt. W. Cameron has a force of men busy sinking a shaft. Arrangements have been made for placing a 50 H. P. dynamo at the mine. The mine buildings will be lighted by electricity, and telephone connection will be established with Iowa Hil .

Plumas.

National-Bulletin: As a result of the late heavy rains a few sluice miners in the vicinity of La Porte and Gibsonville have gone to work. The same is true as to other parts of the county.

Riverside.

Southwest Miner: The Leon mine, near the center of the county, is said to have enough good ore exposed to keep a 20-stamp mill in operation for a number of years.

The Pinon group of mines near Indio, owned by Woodworth and Marshall, are showing up well. A body of rich ore was opened up in one of the mines last week.

The Santa Rosa Gold Mining and Milling Company at Perris has changed its name to Grand View Mining and Milling Company. They employ forty men, and ten stamps are kept running all the time. The ore is said to be very high grade. Their new double-compartment shaft on the upper end of the property is now down 280 feet and they have put a steam hoist on it. The entire place is lighted by electricity.

It is expected that Day & French of the Golden Chariot at Perris will start up again.

San Bernardino.

Southwest Miner: The Gold Mountain mine in Bear valley, owned by E. J. Baldwin, was about six months ago bonded to a syndicate. A few days ago the new superintendent sent word to Thomas Worden of this city to hire fifteen good miners at $2.75 a day for an all-winter job in the mine. A 5-stamp mill will at once be put up and the ore taken out in developing the property this winter will be sufficient to keep the plant in steady operation. If the mine is what the purchasers believe it to be, a mill with at least 100 stamps will be erected early in the spring. This mine was worked on an extensive scale in 1874-5, but during a temporary shutdown early in '76 the 40-stamp mill was destroyed by fire and was never rebuilt.

At the Crowell & Morrow mines, out in the desert from Hinckley, a quantity of ore shipped to the smelter shows good returns.

On the Providence the shaft is down 50 feet and shows a clean vein of ore 4½ feet in thickness. Regular shipments of ore will be made from now on.

San Diego.

Ramona *Sentinel*: Men are being put on at the Hubbard mine.

The rock from the Hassayampa went $22 per ton; that from the Alpha mine $16 per ton.

Stanley and Reeder have made a strike of silver ore to the east of the Golden Chariot, which assays 40 ounces of silver and $4 in gold per ton.

Shasta.

Searchlight: The Cleveland Consolidated mine on Bully Choop was recently examined by an expert for an English syndicate, and as a result a deal is pending that involves the payment of $500,000. R. G. Hart of the Texas Consolidated is one of the principal owners. The development of this property will mean much to the permanent prosperity of this mining section.

The Colorado people interested in gravel mines on the Klamath are backing the extensive preparations made for working the Doeblin mines near Muletown. These deposits have been worked during the winter months for years by means of surface water. Doctor Simons and his associates purchased the property about a year ago. Fourteen miles of ditch and pipe lead water from Brandy and Boulder creeks to the gravel beds, and in a month active washing will commence. When in operation 2000 miners' inches of water will be available. The debris will be impounded in Jackass Flat basin, where a dam has been built, approved by the Debris Commission. At present over sixty men are employed.

On Harrison gulch, the new 10-stamp mill being erected by Captain Roberts on the Edison location will be completed next week, and from that time on the two mills treating twenty tons daily will be kept in constant operation.

W. A. Boswell and Wm. Johnson are reported to have struck a vein of rich ore about three miles from Harrison gulch property.

Sierra.

Mountain Messenger: The Sierra Buttes Consolidated Mining Company has been incorporated by W. H. Martin, P. Tautphaus, E. F. Liebrich, F. Boeckmann and R. Martin to work the celebrated old mine of the same name. It is equipped with a good plant and an excellent mill will be put in first-class repair.

The North Fork Mining Company is now running three mines in Sierra county, the North Fork, Lucky Dog and Bald Mountain Consolidated, employing 120 men.

Siskiyou.

Journal: D. W. Jones' ledge, Quartz valley, is producing ore averaging $100 a ton.

The snow last week, which fell to the depth of a couple of feet in the high mountains, is furnishing plenty of water for the smaller mines to operate, and insures them water for some time to come.

The Seattle Placer Mining Company's claim, on Thompson creek, is being worked.

The Katie May mine, on Greenhorn, is also being worked by Bailey & Carrick.

Trinity.

Journal: The owners of the Lappin mine, Brady, Cochran and Tourtellotte, recently made a test crushing in an arrastra of three tons of rock which milled $100 a ton. There is an abundance of the same rock in sight and the mine promises to be among the best on Deadwood. A stamp mill will be put up in the spring.

The Strode quartz mine at Trinity Center has closed down for the winter after a successful season's run.

Tuolumne.

(Special Correspondence). — The Consolidated Eureka (Dead Horse) mine was shut down last month, owing to the water company shutting off the water to repair the ditch.

Four men have been at work for the last two weeks repairing the shaft at the Hunter mine.

It is rumored here that Mr. Floyd of Soulsbyville is going to start the Star King mine before Christmas.

At the Modoc mine two shifts are at work and the tunnels are in, respectively, 150 and 90 feet. Both tunnels are being run on pay ore and when completed will open up 500 feet of backs on a 14-foot vein.

The Mammoth mine has been bonded to C. Meyers, who, it is stated, will proceed to put up a large plant on the property as soon as it can be got there.

Carters, Nov. 30, 1896.

Union-Democrat: At the Golden Rule the shaft has reached the 600-foot level and operations have been temporarily suspended until those interested decide upon the course of underground work to be done this winter.

At the App the mill started crushing last week after a shut-down of nearly a month for want of water. They are running through about sixty tons per day, and the returns show the rock to be of a higher grade than was expected.

At the Belleview the mill has started up again, running steadily. The mine is now in good condition for the winter.

At the Rawhide the big Cornish pump is being placed in position. Only twenty-five stamps are dropping at present, owing to a lack of electrical power.

The Star has started again after a shut-down for want of water, during which a new three-ton capacity chlorination plant was put in, and also a duplex air compressor, capable of supplying six drills.

At the Alameda a new steam hoisting plant and an air compressor of four-drill capacity have been ordered. The present shaft will be sunk an additional 400 feet.

At the Soulsby in less than two weeks the new hoist and mill, as well as the air compressor, will be ready for work and stoping from the 200-foot level will commence.

At the Dutch the work of enlarging the shaft is going on. They are working up from the 400-level and are now at the 200.

At the Arbona as the drifts are advanced the ledge continues to show up in better shape.

Work on the shaft at the Lady Washington is progressing.

The recent rains have caused a general revival in all classes of mining. Every mill that was idle in consequence of a lack of water has resumed.

W. R. Gillis has sold the Thompson hill mine, near Tuttletown, to a San Francisco company for $5000.

NEVADA.

Pioche *Record*: The April Fool Gold Mining and Milling Company, with a capital stock of $500,000, represented by shares of stock of the par value of $5 each, has filed articles of incorporation. The April Fool was located on April 1, 1892. Since that time between 4000 and 5000 feet of work has been done, the lowest tunnel giving the owners a vertical depth of 350 feet from the surface. The ledge is from 20 to 70 feet between walls, while the work thus far has been confined to one of a number of fissures that have been exposed.

De Lamar *Lode*: Work still continues on the Sunrise, and the parties in charge are encouraged with present appearances.

Work is developing a fine body of good silver ore in the Old Timer mine.

A strike is reported in the Jumbo at De Lamar, which is now under a bond that is shared by De Lamar, Nichols & Griffiths. It is said that the ore shows $35 in gold to the ton.

White Pine *News*: Work has been commenced on the Jim Fisk mine, Robinson district.

HUMBOLDT COUNTY.

Reno *Gazette*: Within two hours drive from Mill City there are a score or more of partly developed gold mines, lying idle for the want of capital, and which may be purchased at a very reasonable figure, or bonded on easy terms. The prevailing idea seems to exist in the minds of strangers that the mining industry of Nevada is confined exclusively to silver, which is a great mistake. While it is true that ten or fifteen years ago little or no attention was directed to gold mining or prospecting in this State, the gradual decrease in the value of silver bullion on the markets has been the means of causing miners to turn their attention to gold prospecting, which has naturally resulted in the development of large numbers of gold properties throughout the State, which is especially noticeable in this county. A few years ago silver predominated, while to-day there are at least three gold mines to one of silver. In some instances they contain gold, silver and lead; the majority, however, are free milling.

The purchasers of the Hendra mines at Dun Glen have recently erected a mill upon the property and will commence operations on the 20th inst. There are between 7,000 and 10,000 tons of available ore in sight, which averages $9 per ton in free gold. The ledge throughout the greater part of the development measures 4 feet in width.

The Smith mine on the same lode has been bonded to H. J. Humphreys for $10,000. It is a newly developed property, having a tunnel 200 feet in length, on a 4-foot ledge, which mills $7 per ton in free gold.

Recent developments on the Mammoth group, in Star district, owned by Woolcock and Phillips, disclose an immense body of gold and silver bearing ore, the ledge matter being from 150 to 200 feet in width, the outcroppings of which can be readily traced for a distance of a mile and a half. It assays from 10 to 110 ounces in silver and from $3 to $20 per ton in gold.

LINCOLN COUNTY.

Thirteen miles southwest of Bunkerville, in Lincoln county, the Copper King mining district has been organized, the area embracing the copper mine owned by Charles D. Lane and Alvinza Hayward, owners of the Utica mine. J. C. Stewart of Camp Vida, Lincoln county, is recorder of the new district.

OREGON.

Jacksonville *Democratic Times*: Work has been suspended at the Ashland mine owing to too much water. A pumping plant will be put in soon.

The Hope mine in Ashland district has been bonded to Thos. James, acting for Eastern capitalists.

Work has been commenced at the Hampton-Lewis mines on Galice creek with one giant. Two more will be put in operation as soon as there is sufficient water.

Baker City *Bedrock-Democrat*: The Bonanza mine proposes to put in twenty additional stamps about May 1st, making forty stamps in all. The last cleanup yielded $20,000, the result of sixteen days' run with twenty stamps.

Grants Pass *Observer*: Charles Stratton has commenced operating his hydraulic mine on Williams creek.

M. W. Bates, of Duluth, Minn., is investigating the nickel mines near Riddle. He represents a company that desires to buy the property.

T. James has bonded the Hope and Shorty mines and has made a first payment of $2,000.

Jacksonville *Times*: The smelter is running at the Illinois copper mines and some good matte is being turned out.

Four monitors and a force of thirty-five men are employed at the Hampton-Lewis mine on Grave creek. Work has been going on day and night, but cold weather is now interfering.

The Noonday Mining Co. of Bohemia district, Lane county, have started their 20-stamp mill.

WASHINGTON.

Spokane *Chronicle*: Some attention has been called to the Clearwater district this year, principally in placer mining. In early days the headwaters of the St. Joe river, as well as a number of other placers in the Bitter Root mountains, were scenes of great excitement.

BRITISH COLUMBIA.

Nelson *Tribune*: The following are returns of shipments of bullion matte and ore from the mines and smelters of southern Kootenay for the week ending Nov. 21st.:

BULLION AND MATTE.

	Pounds.	*Customs Value.*
Hall Mines smelter, Nelson, matte	160,000	$ .....

ORE.

	Tons.	*Approximate Value.*
Slocan Star mine, Sandon	40	$ .....
Idaho mine, Slocan	40	.....
Two Friends, Springer creek	21	.....
Goodenough mine, Slocan	19	.....
Rambler mine, Slocan	16	.....
Antoine mine, Slocan	13	.....
Washington	16	.....
Total for the week	245	$34,870
Total so far for 1896	26,248	$2,911,275

Trail Creek *News*: The Robert E. Lee Company has placed an order for a complete plant, consisting of a 10-mill piston inlet air com-

pressor, hoist capable of sinking 500 feet and a pump capable of pumping for the same distance and a complete outfit of boilers and drills.

The Mayflower will install a first-class hoist on the main shaft, which is now down 70 feet below the level of the tunnel.

The Nest Egg people have ordered a four-drill compressor, a hoist, drills, boilers and pumps, and intend opening up the mine thoroughly.

The Norway, adjoining Trail, has passed into the hands of an Eastern syndicate.

At Slocan the owners of the Noble Five expect to take out 100 tons of ore daily. They are now getting ready for the concentrator.

Ore is being shipped steadily from the Ruth, about fifty or sixty tons a day going out to the smelters.

Rossland *Miner*: An option has been given to D. D. Book & Co of New York on the Highland group and the Union mine.

Ore has been found in the lower tunnel of the Kootenay, assaying $23 in gold.

The I. X. L. mine, the first free milling property to be located in Rossland, is to be worked on a large scale. John S. Baker of Tacoma has incorporated a company in Spokane to take over the property. In the spring a compressor and 10 stamp mill will be erected on the property.

The Le Roi mine is employing about 120 men and shipping daily about 125 tons of ore. New ore bodies have recently been opened up on the 200 and 300-foot levels. At the bottom of the shaft, at the 500-foot level, a chamber is being cut out for a station. The men have cut 26 feet across the vein, all in ore, and with no sign of either wall.

Spokesman-Review: Over 100 men are at work on the mines at Anaconda and a great many locations have been made.

The Deer Park Company has just decided upon the immediate installation of a four-drill compressor, hoist capable of sinking 500 feet, and all the necessary boiler power to keep such a plant in operation.

Kootenaian: The Brennard group of claims, among the first located in the Slocan and which were at one time bonded at $100,000, has passed into the hands of a company made up of Northwest Territory and local men, which immediately began active development work.

Ashcroft *Mining Journal*: The Glengarry and Mayflower, on Cayouse creek, owned by Chisholm and McDonald, have been bonded to Cecil Smith for $1000.

Nelson *Tribune*: The Consolation placer on French creek, with four men at work, is taking out $250 to $300 per week. The gold is not very coarse but some nuggets go about $15, which are at present the largest obtained, the average size being $5 and $6. More men are to be put on right away and work pushed on the main channel, which is expected will give better results.

ALASKA.

Mining Record: The three lode claims known as Seek-no-further, Old Cattaraugus and Merrimac, owned by Phil Starr, Martin Sabin and Marion Thomas, have been bonded for $45,000 to Chicago parties. These claims adjoin the Bald Eagle at Sum Dum and are probably on the same ore vein.

The recent transfer of the Horrible and Mexican ledges at Berners bay to Louis Nicolai will give impetus to quartz mining in southeastern Alaska. Nature exposed the ledges for a distance of more than 1800 feet, while a depth of over 500 feet is visible on the face of the bluff through which ledges run. Each ledge will average a width of fully 5 feet. The expert employed by Mr. Nicolai in the examination of the properties has reported that of the very numerous assays made the lowest return was $8 and the highest $63 gold to the ton. The timbers for a 20-stamp mill will be framed at some point on the sound and its erection will begin about February 1st. The purchase price of the property was $90,000 instead of $60,000, as has been stated.

News: With the completion of the furnace now in course of construction at the Treadwell chlorination works, and the one which is to be built in the annex, the plant will contain six reverberatory furnaces. To each furnace there are four leaching vats, two intermediate vats and four precipitating vats, the first-named being fitted with covers which are so arranged by Mr. Ott as to prevent chlorine gas escaping. This removes a serious objection which laborers have always had to employment in reduction works where chlorine gas is used. Until very recently it has been the custom to allow six hours to each charge. At the beginning of last month Mr. Ott inaugurated the plan of drawing every 5½ hours, and the result has been that each third day an extra charge is gained, which in a month amounts to fifteen or eighteen tons, and at a cost of no more fuel or any additional labor. By the old plan the furnaces averaged 125 to 130 tons a month, whereas they now handle from 140 to 145, the one in which the sulphurets from the Mexican is treated handling 144 tons during October. Another improvement which will shortly be put into effect is the heating of water before it is introduced into the leaching vats.

Work on the Starr-Edwards mammoth ledge on Nevada creek, under bond to Duncan & Corbus, continues. It will require a drive of 900 feet to cross the ledge. The showing made so far is excellent.

UTAH.

Salt Lake *Tribune*: Charles Lammersdorf has secured a controlling interest in the Sevier, and it is expected that improvements that will double the output will soon be made.

Manager Quealey of the Wonder reports the shaft on that mine now at a depth of 520 feet.

The great Sioux-Ajax tunnel, by which the backbone of the Tintic range is being pierced, has now advanced over 1400 feet, and it is not unlikely that prospecting off its level will begin in the next few days. It at least affords an avenue through which to intelligently and economically explore about 200 acres of ground, much of which should be made productive within the next year.

At Eureka ore has been found in the workings of the Grand Central lying between the Mammoth on the east and the Centennial Eureka on the northwest. The ore find was made on the 200 level, although the company has sunk down 700 feet and drifted northeast 1000 feet, at an expense of $110,000, and it is expected to cut the ore bodies by the lower drift when it is run far enough in the same direction.

The North Star mine sent 1000 tons of ore to the Sioux mill at Mammoth and had it milled, resulting in an average product of $9 in gold and 13 ounces of silver to the ton. This makes the great ore bodies in the North Star a good milling proposition, and the company may before long put in a mill.

At Mercur work has just been commenced in the Buckeye and Victor properties by Eastern parties who have bonded them.

At the Herschel they have made a strike, having run into the ore body after driving a tunnel over 1000 feet into the face of the hill. The ore is of the same character as that found in the Sacramento.

At the Geyser the addition to the mill is nearly completed, and the new tanks will be set up and put in operation within a short time.

People representing Colorado and Philadelphia capital have bonded the Copper King properties, owned by Maxwell, May, Young and King, in the Big Indian district, for $80,000: $9000 to be paid down in thirty days and the balance in installments.

M. R. Hunt and his associates have acquired a controlling interest in the Alaska at Silver City. Development will begin at once, with J. R. Price as superintendent.

Bingham *Bulletin*: Manager Schmidt of the Dalton & Lark states reduction works of some sort and of at least 100 tons capacity will be in operation within six months on the old Lead mill site.

Warner & Frisbie, successors of Bero & Peterson in the Zelnora lease, are this week taking active measures to get the Clipper Hill bonanza in shape for working through the winter.

IDAHO.

World: The North Star mine on Shaw's mountain has been tapped at a depth of 300 feet. The ledge is 5 feet wide, with a 14-inch pay streak, and the ore assays $88 in gold per ton. The owners will put up a 5-stamp mill.

Western Mining World: P. N. Nichols, of New York, has secured the Ibach and Suydam properties on Indian creek. The ore so far is free milling and of a value of from $12 to $20 per ton. Negotiations are pending with the Risdon Iron Works for a 10-stamp mill.

MONTANA.

Mining World: The Kennedy mine at Clancy is being developed by Tom Cruse of Helena.

It is reported that the ore in the recent strike in the Broadwater mine, at Neihart, runs from 1560 to 2500 ounces to the ton. More miners have been placed at work, 100 being now employed, and 40 more will soon be placed at work upon the new discovery.

Miner: The work of sinking the shaft of the Colusa Parrot mine to the 1300 level has commenced. The mine is now being worked at the 1100 level.

The Vulcan mine, which has been idle for several years, will probably start up in a few days and a large number of men will be employed.

Garver and Bunnell have sold the G. & B. mine, on the middle fork of Warm Springs creek, to Thomas Cruse and W. J. Sweeney. The terms of the sale are reported to be $50,000 cash.

The Golden Sceptre Mining Company at Quigley, which has assigned with debts of $285,000, may again start up.

Spokesman-Review: In the Yakh district the force on the Goldflint has been increased. A 400-foot tunnel is being run to tap the lead at a depth of 150 feet.

There is strong talk of a concentrator being erected early in the spring to handle some of the refractory ores in the camp.

Development work will be pushed during the winter on the Blue Bell, Tough Nut, Good Hope, Kootenai and the Kokonee.

SOUTH DAKOTA.

Black Hills *Times*: The Union Hill Mining Company have men prospecting and developing the property of the Washington Consolidated Mining Company, in Galena camp, on which they have an option for the purchase of a controlling interest.

This company have started up their smelter and it is now running at full capacity. They are working fifteen men in the Florence tunnel, now in 800 feet, and advancing the drifts driven from it by the original owners. The company's stamp mill is running steadily, the ten stamps handling from thirty to thirty-five tons every twenty-four hours.

It is reported that a majority of the claims surrounding the development shaft now being sunk on the Snowstorm group by I. L. Merrill and associates have, during the past week, been bonded for a short time at good figures.

The Amazon Mining Company have about completed arrangements for the erection of a 20-stamp mill on their property near Custer peak. During the past season they have done a large amount of development work which has shown the property to be a valuable one.

COLORADO.

Republican: At Cripple Creek the Good Will Tunnel Company is to put on machinery at once, starting with leases and right-of-way secured in advance along its full 3000 feet, and contracts for drainage and transportation have been closed with nearly every property on the line.

The Christmas ore chute has been entered in the third level at 230 feet in a distance of 57 feet from the shaft. Ore now shows in all three of the levels and the mine is making a steady production of fifty tons a week.

Capitalists from the East will undertake to drive the deepest and longest tunnel that has yet been started in this district as a legitimate enterprise. Starting at a point on Cripple Creek a few hundred yards below the Brodie mill, the tunnel heads in the heart of the Cripple Creek gold belt in an easterly direction and stops at the Last Dollar mine on Bull hill, 12,000 feet away. In this distance it gains a depth of more than 1400 feet in cutting under the saddle between Bull and Battle, and its end will have a depth of 1238 feet below the collar of the Last Dollar shaft. A force of men has already been started to work.

J. H. Mason has secured the Blue Bird under bond and lease. The bond calls for $250,000 and the lease has six months to run.

An option has been secured by Lanahan & Sons, Wall street, New York, on the Orphan Bell properties. The option is for $350,000 and runs until December 15th of the present year.

The Victor ore chute has been cut in a crosscut run 45 feet east from the eighth level from the main working shaft, which now has a vertical depth of 440 feet. Where entered the ore is about the same body and value as in the levels above, showing the ore to be continuous for that depth.

W. S. Stratton has purchased the holdings of Kennedy & McCreery in the Gold Crater Company, and it is understood that a big consolidation of the Gold Crater and Plymouth Rock groups, and possibly other adjoining properties, is being planned. If this is the case, and the consolidation is effected, it will form the largest block of patented territory in the district and practically cover Globe and Ironclad hills.

The November output from the Anaconda will be about the same as that of last month, or in the neighborhood of $50,000.

The Anchoria-Leland output for November will be about $50,000.

In Silverton district the Zuni tunnel is being driven at the rate of 4 feet per day. It is expected to cut the vein by January 1st at the distance of 500 feet, of which 220 has been completed.

The Veta Madre is under negotiation for a sale to New York parties for $200,000.

George Crawford has placed the Jess mine, located near the Wales, with a New York syndicate for $25,000, of which $5000 has been paid the owner, William McNanamay.

Eastern men are at Fourmile looking over the Timberlake placers, and it is said that a sale of 1200 acres for $200,000 will be effected.

At Victor work has been resumed on the Climax group at the foot of Squaw mountain. The water is being pumped out and the working will be sunk for a new level.

At Ouray the Japan will soon start up with a force of 100 men, after a short period of inactivity.

In the Silver Bell at Ironton a big strike of bismuth, silver and gray copper was made about 300 feet from the old workings, and a force has been placed at work on the vein.

The Guston, at Red mountain, has ceased operations for the winter, and, perhaps, indefinitely. Two engineers and two pumpmen have been retained. Over sixty-five miners were thrown out of employment.

Plans are being prepared for two new smelters on the Austin pyritic method of making copper and iron matte, each of which will have a capacity of 100 tons per day.

In San Juan county the Last Hope Company is arranging for a tramway from the mine to the mill, and will increase the latter from twenty to sixty stamps.

The Lucy mine, the south extension of the Last Hope, in Ice Lake basin, has been sold to Eastern parties for $12,000 and will be developed during the winter.

At Idaho Springs Denver and Colorado Springs parties have associated with C. W. Tyrer in opening up the Golconda group of claims. A crosscut tunnel is being driven from the Fall river side of the mountain It will be 1000 feet in length and will cut the Golconda and other lodes at a depth of from 40 to 60 feet.

A contract for sinking the shaft to a depth of 325 feet on the Eagle mine has just been completed for the Boston people, and levels will now be driven at 150 feet and from the bottom of the shaft.

ARIZONA.

Bisbee *Orb*: Another rich strike has been made on the Alcyon vein in the White Gold Basin mine in Yuma county.

A large body of ore was recently developed in the Senator mine, in Maricopa county, and the mill again started up.

The Bonanza mine at Harqua Hala is working about thirty men and running ten stamps of the mill and taking out considerable metal.

D. B. Gillette is pushing development on his Gold Note mine near Bumble Bee, Maricopa county, and has just completed a new hoist of a large size.

The Vulture is being advertised for sale under a trust deed. It is thought that Senator Tabor has arranged for purchasing it, and that he will start it up on a large scale.

The Coconino Mining Company has purchased a small smelter and will try the experiment of smelting the copper ore from the mines on the rim of the canyon.

Kicker: H. McOla has gone to the San Juan river with a gold saving outfit to work the placers. There are bars all along the San Juan river that are rich in placer gold but it is fine and difficult to save by the ordinary processes.

Journal-Miner: It is reported that placer gold in paying quantities has been discovered near Bill Williams' fork.

Work will be commenced shortly in the erection of the mill in the Providence company's mine on Big Bug.

The Crowned King Company has ordered a large boiler for their steam hoist to take the place of the one now in use. It is also said that they will immediately commence the erection of a new 20-stamp mill at the mine.

It is reported that Judge Griffin has sold his Fortune mine on Lynx hill to the Jersey Lily Company for $30,000 cash.

Yuma *Sentinel*: The Ponce de Leon syndicate has 20 men at work doing the assessment work on the mines.

Eastern parties have secured the Pleiades group of five mines upon which they will put a mill.

The Golden Dream Company will put a mill on their White Gold and Alcyon group of mines as soon as their Noonday mill is running.

GILA COUNTY.

(Special Correspondence).—The Old Dominion Copper Mining & Smelting Company of this camp blew in another furnace on November 10th. This furnace is a 42-inch water-jacket, with a capacity of sixty tons per 24 hours. The rectangular furnace, which has been running for the last three months, has a capacity of 120 tons per 24 hours. This gives the capacity of the O. D. C. M. & S. Co.'s plant at 180 tons per day, which is a much larger capacity than has heretofore been seen in the camp. Another rectangular furnace is now on the ground of the above company, and preparation is being made to have it erected and blown in by January 1st, '97. Then the Old Dominion C. M. & S. Co. will reduce 300 tons of copper ores every 24 hours.

The United Globe Mining Company of Globe, Arizona, is erecting a "Henshoff flat-oval" furnace with a capacity of 120 tons per 24 hours, and it will be blown in about January 1st, '97. This company has also done a great deal of developing work on their Buffalo, Hussier and Dima mines and have some exceedingly nice stopes of ore in all three of the mines, but the largest body is in the Hussier mine The company is erecting a large boarding-house, reading-room and clubhouse on their grounds near their reduction plant for the benefit of their employes, in order to keep their working men from going into Globe every night, a distance of one and a half miles from the smelting grounds.

The Globe Commercial Club of this town have appointed a Committee on Mines and Mining. The committee consist of three of the best mining men in the district—W. W. Hill, M. Innes and P. Oats. The object of this committee is to gather facts and statistics of all the mines and their products in Globe mining district and Gila county, to be published as a pamphlet, giving the information which the Eastern and Western capitalists often desire of the mineral wealth which this district and county possesses.

Globe, A. T., Nov. 30th, '96.

NEW MEXICO.

Silver City *Enterprise*: At Pinos Altos the Treasure Mining Company of Denver will soon start sinking the shaft below the 300-foot level on the Atlantic vein. About fifty men are employed at the mine and mill and the property is paying handsomely. The same company will also start sinking below the 400-foot level on the Deep Down vein.

At Copper Flat five shafts have been sunk on the property, four to a depth of 150 feet and the fifth to a depth of 220 feet. This development work uncovered very encouraging ore bodies from the start, and drifts were started upon the ore bodies at depths ranging from 100 to 200 feet. Thirty men have been kept constantly employed upon development work for a year past. It is probable that the new works will blow in before February 1st, 1897.

The Southwestern Coal and Iron Company is shipping two cars of iron ore per day to El Paso and two cars per day to Pueblo from San Jose station. The iron is taken from the Iron Bottom mine, owned by the company.

At Cook's William Kief is working sixty men on the El Paso Smelter Company's claim, which he is working under lease.

LOWER CALIFORNIA

A. H. Lacy and A. R. Bryson of Los Angeles have bonded the Bareno mines in Lower California for $100,000.

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 24, 1896.

571,993.—PUMPING MACHINE—F. H. M. Davis, Los Angeles, Cal.
571,949.—BOTTLE STOPPER—G. Koehler, S. F.
572,029.—VENCING DEVICE—G. O. Ranson, Portland, Or.
571,936.—ARM REST FOR BOOKS—A. J. Soto, Martinez, Cal.
572,038.—SEWER TRAP—J. T. Titus, S. F.
572,080.—SPEEDING DEVICE—H. G. Wilshire, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

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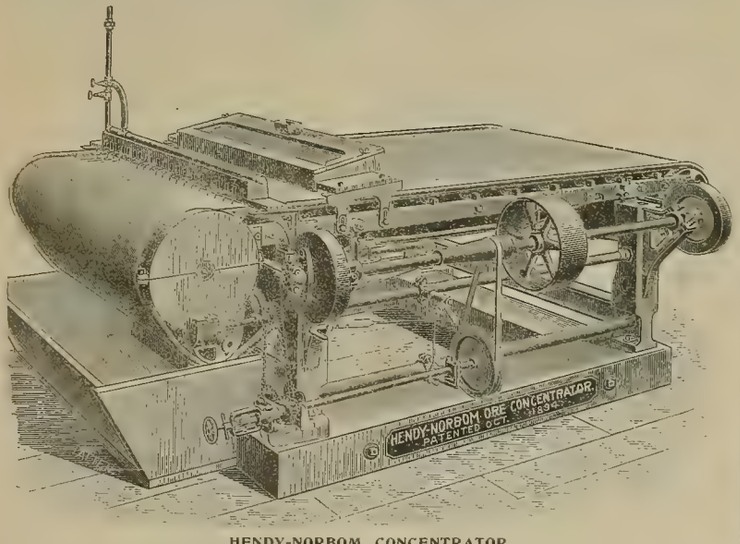

HENDY-NORBOM CONCENTRATOR.

Office of G. McM. Ross, Superintendent Webb Gold Mining Company.
Brown's Valley, Cal., September 14, 1896.

Mr. John D. Norbom—DEAR SIR. I have been using your Concentrators at our mines in Brown's Valley and am pleased to inform you that they are in every respect thoroughly satisfactory. When erecting the plant at the above-named place we built Canvas plant, but since putting in your Concentrators we have but little use for that. The percentage of sulphurets now being handled is from 1½ to 2 per cent, mostly galena and iron pyrites, and crushed fine. We save from the pulp over your machine 98½ per cent, and it hardly pays for the labor on the Canvas plant. The motion given your Vanner by its delicately constructed curved springs renders it a perfect machine, and in my estimation it is but a short time before it will replace all other machines of a like nature now in use.

Yours very respectfully. F. W. PAGE, General Manager.

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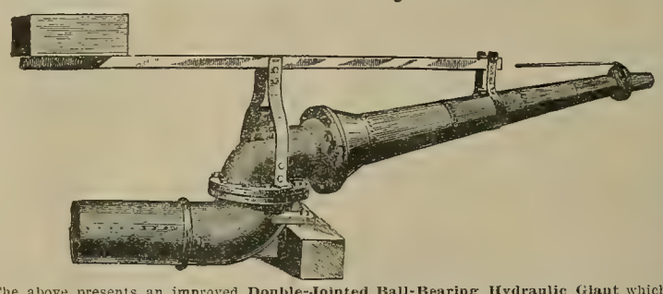
Double-Jointed Ball-Bearing Hydraulic Giants.



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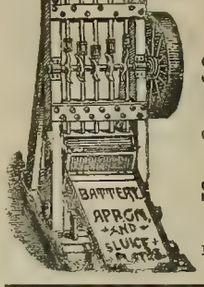

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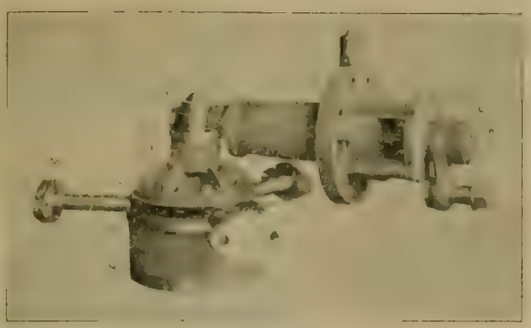

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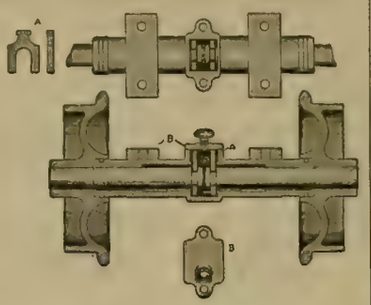

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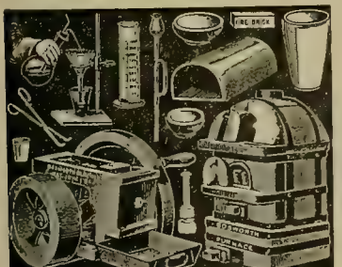

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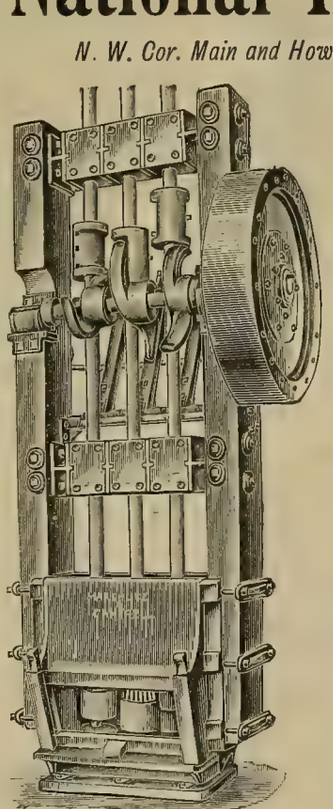

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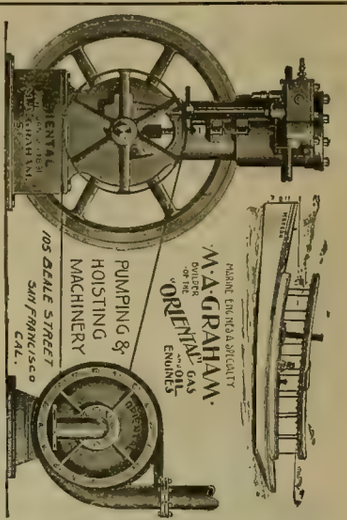

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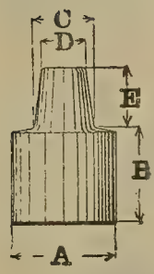

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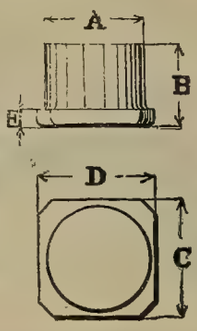

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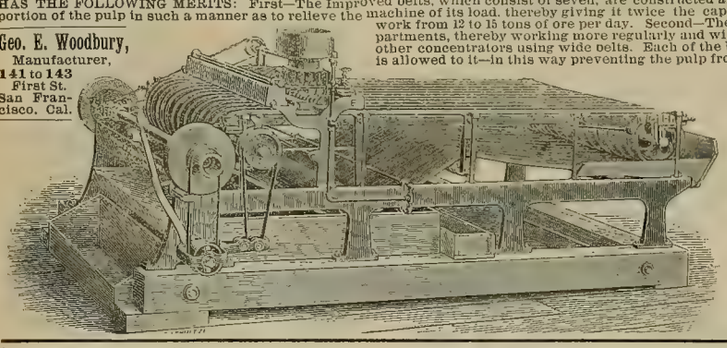

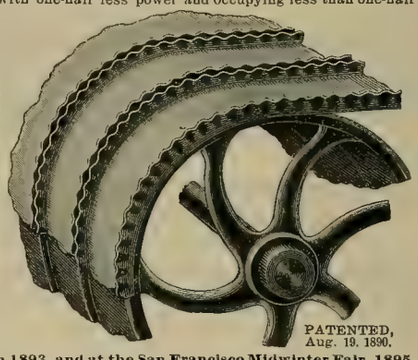

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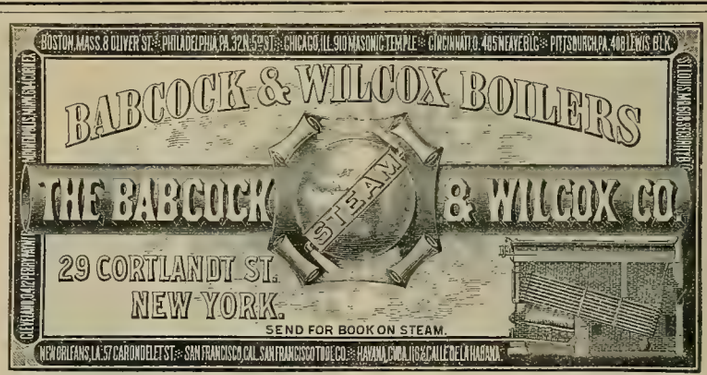
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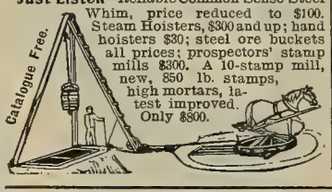

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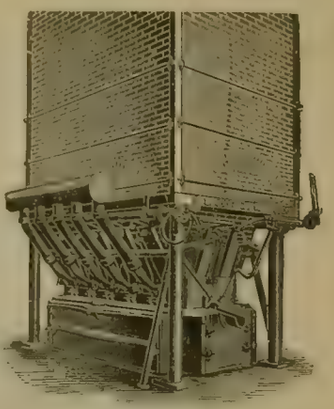

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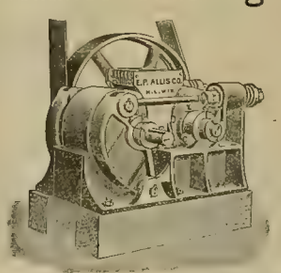

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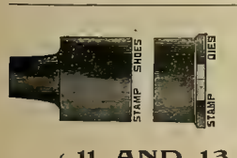

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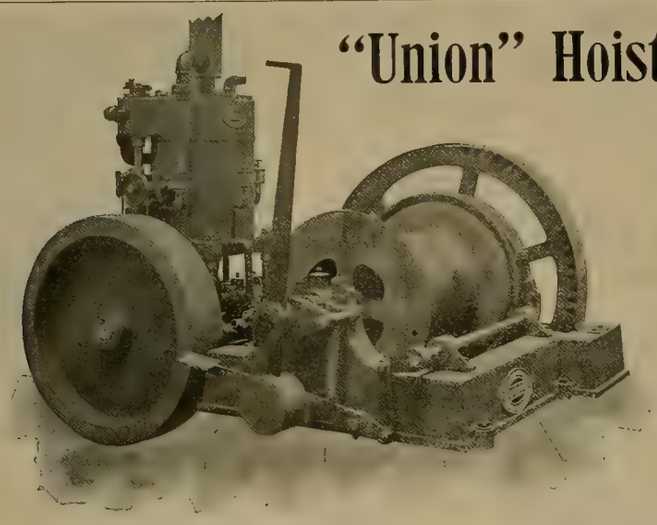

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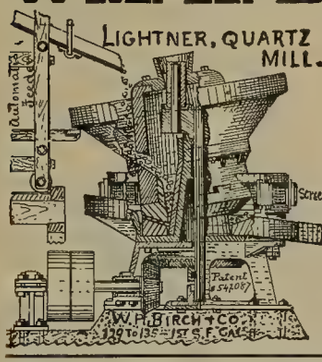

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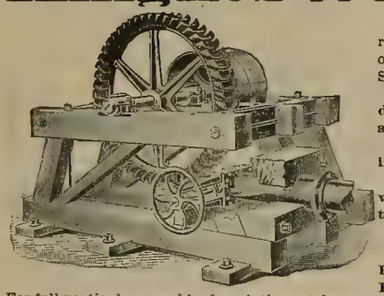

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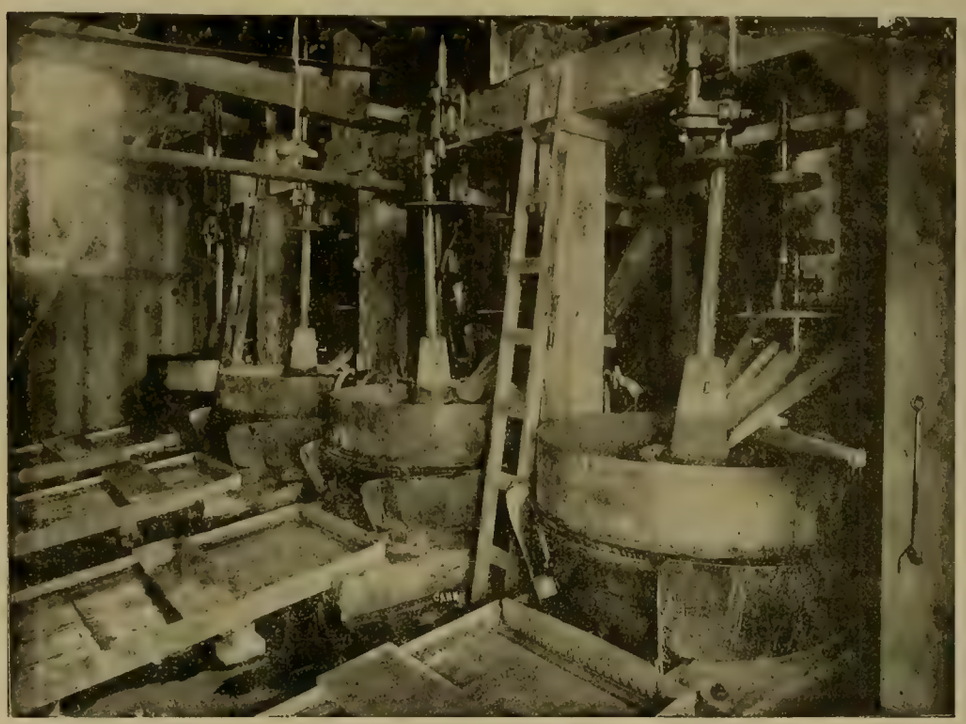

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It requires only a 2-horse power Daniel Best Crude Oil Engine to operate this Mill and one concentrator. Engine and Mill can be set up and running in 48 hours.

Price of Mill $1,000, f. o. b. San Francisco, including Self-Feeder, Ore Hopper, Frame and Foundation Timbers all framed, and one Silver Copper Plate. Weight, 2½ tons; heaviest piece, 1350 pounds.

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FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.

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THIRD: The Large Amount of Space Saved.

Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.

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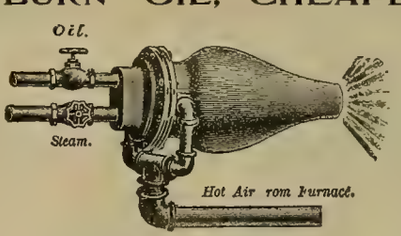

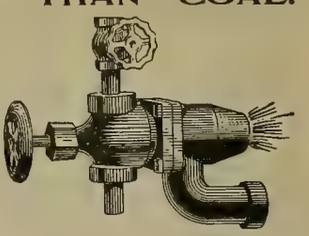

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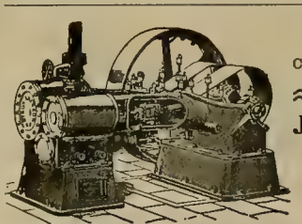
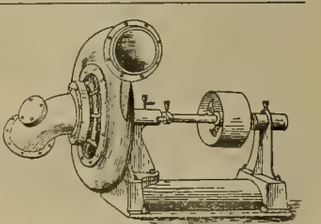


WRITE FOR CATALOGUE NO. 15.

Jackson's GAS —AND— OIL ENGINES.



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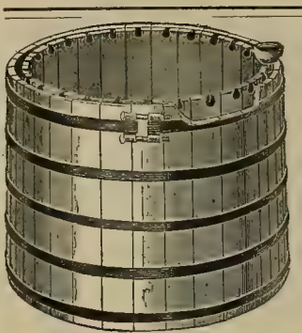

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Market Reports.

The Markets.

SAN FRANCISCO, Dec. 3, 1896.

Jobbers report an increase in trade. Large arrivals of interior merchants have been the feature of the week, whose purchases have been on a more liberal scale. Manufacturers, as a rule, report running on fuller time. It is reported that considerable structural material is being taken for up-north to replace some of that destroyed by the floods. The market for metals is fairly steady at the recent advance.

The local money market is essentially unchanged. There is a continued depositing of hoarded money in both commercial and savings banks, which admits of better accommodations to borrowers. It is the general belief that after the turn of the year the rates of interest will be shaded on the better class of security. Remittances of money to the East are fair, which causes Eastern exchange to rule strong. Eastern advices report that money is coming out for investment. This favorable feature is reflected in increasing deposits in Eastern commercial and savings banks. Our New York advices report that market as follows: Time loans are still in small request. Business is mostly at 3½@4 per cent for all dates. Commercial paper is quoted at 4¼@4¾ per cent for sixty to ninety-day endorsed bills receivable; 4¾@5¼ per cent for first-class and 5¼@6¼ for good single names. There is a fair supply of paper in the market. Most of the really choice paper recently offered about by brokers has been absorbed, and notes of that kind are now in active request among the banks. The result is now seen in a freer movement of paper that may be called of a secondary grade. This is mostly the notes of interior manufacturers.

New York Silver Prices.

NEW YORK, Dec. 3.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	29 15-16	65⅛
Saturday	29 15-16	65⅛
Monday	29⅞	65
Tuesday	29⅞	65
Wednesday	29⅞	65
Thursday	29⅞	65¼

	Copper.	Lead.	Iron.	Tin.
Friday	11 35	3 00	11 00@13 00	13 07½
Saturday	11 35	3 02½	11 00@13 00	13 05
Monday	11 35	3 05	11 00@13 00	13 00
Tuesday	11 35	3 05	11 00@13 00	13 00
Wednesday	11 30	3 05	11 00@13 00	12 90

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	10c Prem
New York Telegraphic Transfer	12½c Prem
London Bankers' 60 days	$4.84
London Merchants	$4.83½
London Sight Bankers	$4.87½
Refined Silver, per oz., 1000 fine	65
Mexican Dollars	51@52

SILVER.—The market has ruled fairly steady the past week. The steamer City of Peking for the Orient took out $336,650 in bullion. This is quite an increase on average shipments made the past three months, and goes to show that the export demand is setting in. Eastern advices state that there is a continued fairly free shipping movement, sufficient at any rate to take receipts and also over 2,000,000 ounces thrown on the market by parties who have held in expectation of higher prices. It is said that some more will come out before the close of the year, which may tend to keep prices from advancing for a short time. Our New York advices to November 28th report that market as follows: The London market for silver is firm in sympathy with the steadiness of India exchange and on the possibility of buying of silver by the British Indian Government for the purpose of coining rupees to meet the demand for money in that country.

MEXICAN DOLLARS.—The last steamer for the Orient took out 1,484,132 dollars. This is the largest shipment at any one time this year. Dealers report that the demand from importers is increasing. The market is steady.

QUICKSILVER.—For the season there is a fair home and shipping demand.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

COPPER.—The market is fairly steady. Eastern advices indicate some shading in prices, but in view of the large consumption abroad and increasing demand from home consumers it would seem that any weakening would be of a temporary character. New York mail advices just to hand reports as follows: The most interesting feature in connection with the market was a report that the English Government has recently purchased 1000 tons of ingot, and that 2000 tons have been taken for shipment from Europe to this side of the Atlantic. The latter movement is somewhat mysterious, but probably not wholly free from late speculations.

Ingot, jobbing	14½@—
Ingot, wholesale	13½@—
Sheet copper	17 @—

LEAD.—The market has held steady. An improved demand is looked for after the turn of the year. Eastern markets are steady to firm with supplies moderate only.

Our market is quoted as follows:

Pig	—	@	3 75
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is a good demand for all sizes.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs			$1 20
Drop, B and larger sizes,	"	"	1 45
Buck, Balls and Chilled, do,	"	"	1 45

ANTIMONY.—Our market is quoted at 7½@8c in a jobbing way. New York mail advices quote 7¼@7½c for Cookson's, 6¾@6¾c for Hallett's and 6¾c for Japanese, from store.

BORAX.—The market is barely steady. There is a continued free movement eastward.

The market is quoted as follows:

Refined, in car lots	5
Refined, in sacks	4¾
Powdered, in car lots	4½
Concentrated, "	5

TIN.—Pig is a shade easier, but plates are steady to firm. Eastern advices state that American manufacturers have sold well up to June and July.

Pig, per lb	14¼c@	—
Plate, I C coke, heavy, per box	— @	$4 05
" " " light, "	— @	3 95

IRON.—There can be no doubt but the consumption of pig on this coast in 1897 will show a decided increase over that of the year just drawing to a close. At the East the feeling does not appear to be quite so bullish, owing to the belief gaining ground that furnacemen and others are going ahead too fast. Referring to the situation the *Iron Age* says: "An undercurrent of disappointment is noticeable in nearly all reports. Possibly it is simply a reaction after the hopeful anticipations of the early part of the month. Some think that it is the result of natural antagonism among buyers against combinations. The Wire Nail Association will go into history as the most noted example of an effort to set the laws of trade at defiance, and the iron trade generally will welcome a return to normal conditions in this industry, because it means untrammeled consumption."

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

Bolt.....¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing..... 20

POWDER.—The market is active at unchanged quotations.

The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, "	8½c

COAL.—There is nothing particularly new to report. The demand is steadily increasing; but as spot stocks and near-by arrivals are fairly large, no improvement in prices is reported. For forward shipments both England and Australia report firm markets.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$7 50@ 8 00
Greta	6 00@ 6 50
Nanaimo	6 50@ 7 00
Gilman	5 50@ 6 00
Seattle	5 50@ 6 00
Coos Bay	— —@ 5 00
Cannel	— —@ 8 00
Egg, hard	12 00@13 00
Wallsend	— —@ 6 50
Scotch Splint	— —@— —
Brymbo	— —@— —

TO ARRIVE—CARGO LOTS.

Australian	5 50
Liverpool Steam	6 25
Scotch Splint	— —
Cardiff	6 25
Lehigh Lump	9 00
Cumberland	13 00
Egg, hard	10 00
West Hartley	6 50

COKE.—The market is quoted as follows:

Gas Companies'	— —		— —
English, to load	9 00	@	— —
" spot, in bulk	9 00	@	10 00
" in sacks	11 00	@	12 00
Cumberland	— —	@	— —

LUMBER.—There is a good outward movement.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—At the reduced quotations the trade has taken hold more freely.

The market is quoted as follows:

Wire, carloads, basis per keg			....
" jobbing, " "			$2 75
Cut, carloads, " "			....
" jobbing, " "			2 50

Mining Share Market.

SAN FRANCISCO, Dec. 3, 1896.

The market advanced slightly the forepart of the week under review in sympathy with Chollar, Potosi and Savage which sold respectively up to $2.35, $1.10 and 68 cents. The advance brought in sellers, which was taken advantage of by the bears to force a decline of nearly 25 per cent in the leaders. The lower prices caused some buying for a turn which steadied prices, but only for two sessions when, under another selling pressure, both Chollar and Con. Virginia sold down to $1.50 and the rest of the list proportionately. The advance was due to the Chollar management starting crossdrifts on the 400-foot level to run for the ore found above while the decline is said to have been brought about by free selling by one or more large holders which was soon discovered by others, who also commenced to sell. Reports are current that in both Chollar and Hale & Norcross the 400-foot level does not come up to expectation. It is a matter of record that the Hale & Norcross management has become convinced that so far as their grounds are concerned the work has proved a failure, no ore worth speaking of having been found; acting on this the company has notified the Brunswick lode mining companies that it will withdraw from the working compact. This information has caused many operators to discredit the entire lode who either sold short or else their holdings. While this is the situation at present dealers ought not to become too frightened for the work in Gould & Curry and Best & Belcher is said to be quite promising, and a body of ore may yet be struck. The official letters received from the superintendents the past week are not calculated to enthuse shareholders, but, on the contrary cause an uneasy feeling. Perhaps this is what is desired so as to get outsiders to sell by which shares of the more favored mines can be better concentrated for future operations. There can be no doubt that the decline in the market has caused considerable selling by outsiders. Who has bought is a debatable question, but from an outside standpoint it seems as if strong parties have done so. Even if moneyed men are in the market it is no reason why others should come in for the former can send prices as they have before, very low and keep them down while collecting assessments.

The shares of the Bodie mines begin to show strength.

From the Comstock mines the news, taken as a whole, is unimportant so far as immediate results are concerned. Both private and public advices point to more time being required before striking ore, but this condition is not different from what has obtained for several years past. In Alta they are still working on the 725-foot level. A little ore is saved each week. From Overman nothing new has come to hand. An assessment has been levied, which may help in making public any ore found. Seg. Belcher and Belcher continue to raise ore, but from what level official letters are silent. This silence causes the better class of operators to believe that the work being done is of quite an important character. Work has not been resumed in Crown Point. News from Yellow Jacket is hard to get. In Confidence a few tons of ore are raised each week. No work is reported in Challenge. The Confidence-Challenge-Con. Imperial west crossdrift is being driven slowly ahead. In Con. Imperial west crossdrift No. 3 is still being driven ahead. In Alpha they ran into favorable stringers while extending west crossdrift on the 500-foot level. In Bullion no change is reported in the work. The work on the upper levels in Potosi may result in considerable ore being found, but at present only bunches of fair grade are reported. Work was suspended in Chollar on November 26 so as to work up all the ore on hand in the chutes and dumps at the mill. The stoppage of work also helps to get the prices of shares down. In Hale & Norcross they are still working on the 900-foot and 1100-foot levels. On the latter level stringers of quartz have been cut in extending the east crossdrift. Work is continued in the Gould & Curry and Best & Belcher joint east crossdrift from the Bonner shaft. In Con. Virginia they are still working on the 1000-foot, 1650-foot and 1750-foot levels. Our advices, as also public advices, do not report any material change in the material encountered in prosecuting the work. The official letter from Ophir continues to report progress and low-grade ore on the Central Tunnel level, and also 1000-foot level. They seem to know how to kill time as well as tire out shareholders. But in this respect the company does not appear to be much, if any, different from several of the others. In Mexican they report passing through porphyry and clay seams in prosecuting work on the 1000-foot level. Advices from Union, Sierra Nevada, Utah and Andes do not report any change worth noting.

From the Brunswick lode private advices are discouraging. It is stated with a positiveness which does not admit of denial that not only the work in Hale & Norcross is a failure, but that in Chollar is also. The action of the shares would seem to confirm these unfavorable assertions. Official letters do not report extracting of ore on the 300-foot Chollar level, but they report fair progress in the different crossdrifts on the 400-foot level. In Occidental the work is not essentially different from that reported last week. The official letter from Hale & Norcross reports work on the 400-foot level, without, as yet, anything being found aside from two or three stringers. The work in Savage, Gould & Curry and Best & Belcher is said to be of quite an important character. Some mining men go so far as to say that if a body of ore is found on the Brunswick it will be in one of these. This opinion is stated to be on the favorable character of the ground in the different levels on which work is being done.

The following illustrates the changes of the week:

Mines.	Nov. 25.	Dec. 3.
Alpha	$ 10	.....
Alta Consolidated	.....	.....
Andes	19	.....
Belcher	37	$ 38
Best & Belcher	.....	74
Bodie	.....	.....
Bullion	14	13
Challenge	.....	.....
Chollar	2 00	1 70
Confidence	95	.....
Consolidated California and Virginia	1 65	1 55
Consolidated New York	.....	.....
Crown Point	.....	26
Exchequer	.....	.....
Gould & Curry	.....	.....
Hale & Norcross	1 40	1 00
Justice	.....	.....
Mexican	53	48
Ophir	1 20	1 15
Overman	09	.....
Potosi	84	.....
Savage	.....	49
Sierra Nevada	.....	47
Union	.....	41
Utah	.....	.....
Yellow Jacket	34	.....

San Francisco Stock Board Sales.

SAN FRANCISCO, December 3, 1896.

9:30 A. M. SESSION.

400 Best & Belcher	68	100 Mexican	46
200 Bullion	13	700 Ophir	1 10
400 Chollar	1 65	700 Savage	49
50 Con Cal & Va	1 50	600 Sierra Nevada	47
100 Crown Point	26	200 Union	41
350 H. & N	98		

SECOND SESSION—2:30 P. M.

300 Ophir	1 15	350 Chollar	1 70
300 Mexican	48	200 H. & N	1 00
100 Best & Belcher	74	1100 Belcher	38
300 Con Cal & Va	1 55	20 Union	40

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.	Secretary.
Challenge Con M Co	22	10c	Oct 14	Nov 17 Dec 8	C L McCoy, Mills Bldg
Channel Bend M Co	5	2c	Nov 9	Dec 12 Jan 2	J P Langhorne, 39 Sutter
Eureka Con Drift M Co	5	5c	Nov 24	Dec 28 Jan 18	D M Kent, 330 Pine
Exchequer M Co	39	5c	Nov 14	Dec 17 Jan 11	Chas. E Elliott, Nevada Block
Greenwood G M Co, Cal	1	2c	Oct 16	Nov 23 Dec 14	Chas E Elliott, 309 Montgomery
Horsefly G M Co	1	25c	Nov 4	Dec 21 Jan 20	R T Ward, 610 Clay
Horse Shoe Bar Con M Co	5	10c	Oct 29	Dec 5 Dec 26	D M Kent, 330 Pine
Jamison M Co	9	5c	Nov 27	Jan 25 Mar 22	Sam W Cheyney, 120 Sutter
Justice M Co	61	5c	Oct 14	Nov 17 Dec 8	R E Kelly, 309 Montgomery
Nimshew G M Co	2	2c	Oct 2	Nov 9 Nov 30	C D Cook, Pier 1, Mission St
Marguerite G M & M Co	4	20c	Sept 21	Nov 10 Dec 15	Chas Peach, 237 12th
Mt Diablo M & M Co	5	10c	Oct 27	Nov 30 Dec 21	R W Heath, 318 Pine
North Gould & Curry, Nev	17	10c	Nov 4	Dec 5 Dec 22	C H Mason, 337 California
Occidental Con M Co	25	15c	Nov 24	Dec 29 Jan 18	A K Durbrow, 309 Montgomery
Overman S M Co	76	10c	Nov 28	Dec 31 Jan 22	Geo D Edwards, 414 California
Reward G M Co	16	2c	Nov 11	Dec 14 Dec 30	S W Backus, Mills Bldg
Silver King M Co	15	25c	Oct 26	Dec 7 Jan 5	J W Pew, 310 Pine
Thorpe M Co, Cal	4	5c	Oct 14	Dec 12 Jan 9	A F Frey, 567 Market

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Jupiter Gravel M Co	W A Keefer, 14 Grant Ave	Dec 7

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THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from Edgar Maylone, in the Bald Mountain mine, near Fair Play, El Dorado county, to deposit tailings in Spanish creek; from Nickelson & Williams, in the Crawford diggings, near Camptonville, Yuba county, to deposit tailings in Bridger creek; from McDonald & Hoffman, in the Gilbert mine, near Yankee Jim's, Placer county, to deposit tailings in Devil's canyon; and from the Oregon Gold Mining Company, in the Forty-nine mine, near Enterprise, Butte county, to deposit tailings in a ravine, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on December 7th, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hyd aulic process from C. W. & W. W. Martin, in the North Star mine, near Placerville, El Dorado Co., to deposit tailings in White Rock Creek; from Stevens, McKenney & Co., in the Boulder Hill mine, near Placerville, El Dorado Co., to deposit tailings in Ringold creek; from An Sing, in the Hayden Hill mine, at Green Valley, Placer Co., to deposit tailings in an old pit; from George W. Jones, in the Buckeye Hill mine, near Nevada City, Nevada Co., to deposit tailings in a ravine; and from A. H. Holgate and others, in the Golden Gate mine, near Onion Valley, Plumas Co., to deposit tailings in Winter's creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on December 21, 1896, at 1:30 P. M.

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Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star mining district, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 24th day of November, 1896, an assessment (No. 25) of fifteen (15) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 18th day of January, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 27th day of November, 1896, an assessment (No. 9) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of January, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 22nd day of March, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

DELINQUENT SALE NOTICE.

GREENWOOD GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Greenwood, El Dorado county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the Sixteenth (16th) day of October, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Adams, Grove	7	11,000	220 00

And in accordance with law, and an order from the Board of Directors, made on the 16th day of October, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 79, Nevada Block, 309 Montgomery St., San Francisco, California, on MONDAY, the 14th day of December, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

CHAS. E. ELLIOTT, Secretary.

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Table of Contents:—Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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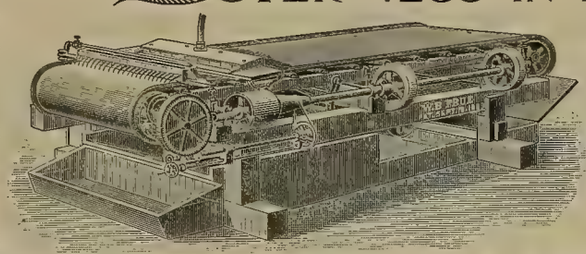

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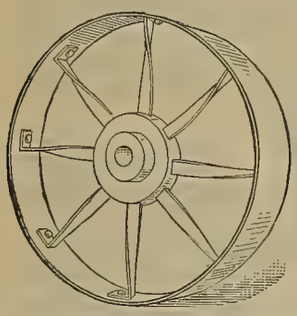

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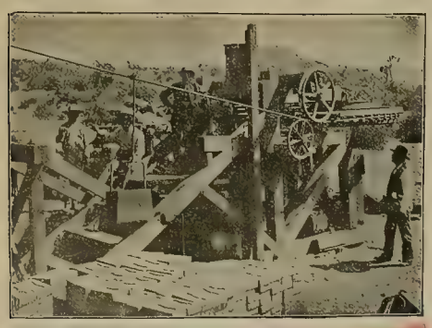

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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

No. 1901.—VOLUME LXXIII. Number 24. SAN FRANCISCO, SATURDAY, DECEMBER 12, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

The Mining Bureau's Publications.

The annual report of the State Mineralogist will be published some time this month. In his report to the Board of Trustees Mr. Crawford recommended that the data relating to important mining counties, besides being printed in the usual report, be afterwards segregated and published in pamphlet form, some 1000 copies to be supplied to the supervisors of the respective counties for distribution. This was a valuable suggestion, and was made in pursuance of requests from representatives of several of the counties. It had been pointed out that in response to requests from non-residents for information as to any county one of these pamphlets could be sent. To send the whole report would not in all cases serve the purposes desired, for in some cases the recipient's attention would be directed to other counties, and the very object desired—namely, awakening an interest in the county—defeated. Another point worth considering would be the saving of postage.

Mr. Crawford accordingly made a requisition upon the State Printer for such separate reports for fifteen or twenty counties, but this was not allowed, for the reason that there was not enough type in the State's printing office to let the whole report stand in type until the county pamphlets could be printed from it. It was also suggested that the general report be stereotyped and the county reports made up from that. This was not allowed on the ground of expense.

However, Mr. Crawford, then, in pursuance of a promise made to Assemblyman Reid of Trinity county, and in the nature of an experiment, made a requisition for the publication in a separate pamphlet of the data relating to Trinity county, to be distributed by the supervisors of that county. This requisition was allowed. The result of this experiment will be looked forward to with interest.

The extra expense involved in these separate publications cannot be large, and it is to be hoped that some arrangement in the future may be made by which each county that desires it may have its separate pamphlet. It has been suggested that some of these counties would be more than willing to share in the expense. This would be only fair, for while some counties would require large numbers of pamphlets others would obtain no advantage from them.

Before the next report is published it is to be hoped that some arrangement will be made for stereotyping the forms not only of the report but also of the bulletins issued. It is very difficult to estimate in advance how many copies of any publication will be required. The numbers printed of the twelfth annual report was exhausted within five months after publication and many thousands would have been required to supply the extra demand.

There are many reports published by the State at considerable expense that are of little value. If there is any reason at all for publishing these reports, for which there is such a large demand, that demand should be supplied.

THE 1250-H. P. STEP-UP TRANSFORMERS AT NIAGARA. (See page 483.)

THE STEP-DOWN TRANSFORMERS AT BUFFALO. (See page 483.)

Gold Yield of 1896.

It is claimed that the output of gold from the Baker county mines in Oregon for 1896 will exceed that of 1895 by 40 per cent. There will also be a large increase in the yield of the mines of southern Oregon—in fact, all along the Pacific coast from Sinaloa, Mexico, to the Yukon river in Alaska, in nearly every mining district the gold yield this year will show a considerable increase over that of last year. The same may be said of Nevada, Utah, Colorado, South Dakota, and the rest of the region lying west of the Rockies. As a consequence, if there is any substantial increase in the world's output of gold over that of last year, it is probable that more of it will come from the western part of North America than anywhere else. It is safe to say that this increase will exceed ten millions of dollars.

The African yield will hardly exceed that of last year, and the Australian output may fall short. In Russia and South America there will probably be some increase.

That the output will be still further increased on the Pacific coast for several years to come there can be little doubt. The large amount of development work done and being done on proved properties in California and the new discoveries of other districts give guarantee of that.

THE gold yield of California in 1895 was $15,334,317. Most conservative estimates place the yield of 1896 at from sixteen and a half to seventeen millions. With the big mines now developed, and upon which mills are being erected, there can be no question that there will be a greater increase in 1897.

MINING AND SCIENTIFIC PRESS.

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J. F. HALLORAN.....General Manager

San Francisco, December 12, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—The 1250 H. P. Step-Up Transformers at Niagara; The Step-Down Transformers at Buffalo, 477. The Rotary Converters at Buffalo, 483.

EDITORIAL.—The Mining Bureau's Publication; Gold Yield of 1896; Gold Yield of California in 1895, 483. The State Mining Laws; Report of the Geological Survey; The Mineral Land Bill; Of Business Value; The Argonaut and Secretaryship of Mines, 484.

ELECTRICAL PROGRESS.—Niagara in Harness, 483.

SCIENTIFIC PROGRESS.—Aluminum Cooking Utensils; Bricks from Slag; A Prevalent Idea, 483.

MECHANICAL PROGRESS.—Fire-Proof Construction; Advance in Engine Indicators; Testing Cast Iron Car Wheels; Testing Steam Gauges, 484.

PRACTICAL INFORMATION.—The World's Oil Supply; Largest and Fastest Locomotives in the World; Proposed Canal; Progress in Japan; Of Interest to Bicycle Riders, 484.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 486-7.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 494.

MISCELLANEOUS.—Concentrates, 479. Nevada City District Geology; The Mineral Deposits of Eastern California, 480. The Storage of Water in Earthen Reservoirs; Deep Mining on the Rand, S. A., 481. Centrifugal Pumps; Glossary of Mining Terms, 482. Recent Additions to the Museum of the California State Mining Bureau; Recent California Mining Incorporations; Recently Declared Mining Dividends; Coast Industrial Notes; Personal, 485. List of U. S. Patents for Pacific Coast Inventors; Notices of Recent Patents, 488.

The Argonaut and Secretaryship of Mines.

In a late issue of the San Francisco *Argonaut* appeared an editorial in which it said :

The movement started in favor of a "Department of Mining" and a new Cabinet official whose title should be "Secretary of Mines," we consider highly absurd. The Government of this country is for the whole country, and not for a few of the States. The year the last census was taken—1890—the director of the mint gave the output of the gold and silver mines at $97,735,730. Eighty-eight millions of this came from California, Colorado, Montana, Utah and Nevada—five States. The census gives the value of manufactured products for 1890 at nine billions of dollars! There is no "Department of Manufactures," yet from the foregoing figures it would seem to be much more needed than one of mines. Further, if all the States containing mines other than those of gold or silver were added to the list of five States given above, it would not make one-third of the roll of commonwealths in our Federal Union. The Government of this country is for the people, and all the people, and not for the mine owners alone. We may further remark that we think this is an excellent time for the mine owners to stop "demanding" things.

The *Argonaut* has long had a reputation for being rather certain of its facts whatever might be said of its conclusions. But in this case the facts are carefully avoided.

If all the States containing mines other than gold and silver were added to the list it would make a roll of all the States and Territories. There are several States in the Union in which the mineral product is far more valuable than that from any of the gold and silver States.

The mineral product of the United States is valued at over $600,000,000 and is increasing faster than any other product. The comparison of this with the value of the annual manufactured products is not fair. From this value of manufactured products should be taken the value of the mineral products, the value of the agricultural products and of the imported raw material used in manufacturing in order to get at the amount of wealth added annually by the manufacturers. It is doubtful if it would exceed the value of the mineral product which is all—every cent of it—so much added to the wealth of the country.

The mining industry does not need nor ask any assistance from the Federal Government that will entail any expense worth mentioning. All that is asked is that the Government place the industry in a position to obtain the same benefits from its laws and machinery as others. There is in the minerals of this country a source of great wealth, that has long done much for the material prosperity of the United States. It should be conserved, and a little intelligent discretion on the part of the Government will save many millions that would otherwise be irretrievably lost.

As to "demanding" things, it seems hardly fair for as stanch an advocate of high protective duties for the manufacturing interests as the *Argonaut* to speak of that.

The Mineral Land Bill.

The Mineral Lands Committee of the California Miners' Association will meet in this city to-day, to take steps toward securing the passage at the present session of Congress of the Mineral Land bill. It is of great importance that the bill be brought up and acted upon as early in the session as possible. If it is allowed to stay in committee toward near the end and get into the rush of the last days of the present Congress, its enemies will find it an easy matter to have it side-tracked, as was the case at the last session. The sooner it is brought forward the better its chances of passage.

Since the last session of Congress the railroad people have been very active in the work of securing patents for lands that are unquestionably mineral in character, and if the proposed bill is not passed at the present session, there will be little use in bringing it up again. In Trinity, Shasta and Siskiyou counties the railroad is especially active at work. The local miners' associations and the papers are doing what they can to prevent those frauds.

In a great many cases the railroad expects to carry its point and patent the lands through the failure of the locators to see the published notices. In order that they may not have this advantage, the county organizations are taking steps to see that those interested are personally notified. The Ætna, Cal., *Report* in a late issue says :

In these contests the railroad company generally depends largely for victory on default to the citations by those persons interested. Therefore it behooves those who are summoned to appear at the land office for the purpose of defending their rights, to take the necessary steps for properly presenting evidence as to the mineral character of the lands in dispute. If the decision of the land office should be adverse to the miners, it will mean the consumption of much time and money in appealing the cases to the Washington authorities for just adjudication. Therefore those who are cited to appear should leave no loophole through which the railroad company can consummate its object.

The object of the Mineral Lands bill is simply to provide that all these cases be honestly and fairly adjusted, and to take from the railroads the unfair advantages they now have.

The State Mining Laws.

The sub-committee of the California Miners' Association Committee on Legislation, having in charge the proposed mining laws to be presented to the State Legislature, has made a good beginning. The proposed laws, as published in the MINING AND SCIENTIFIC PRESS of October 31st and November 7th, with some changes suggested by members of the committee and by others interested, could well be printed in pamphlet form, copies sent to each member of the Legislature, and they be requested to consider them so as to be ready to act upon them as early in the session as possible, in order to secure their passage before the time of the Legislature is taken up with the large number of bills that naturally come in and take up the time and interest of individual members.

There can be no objection to the passage of such laws as are proposed. They are becoming more and more a necessity to the mining industry and cannot in any way injuriously affect other interests. No one can be interested in opposing them. Their passage will entail no extra expense on the State government, but should, in time, save considerable in the way of litigation.

The proposed bills have been submitted to the Governor for his consideration, and it is believed that he will make favorable mention of them in his message to the Legislature. Governor Budd has often expressed his willingness and desire to do all in his power for the good of the mining industry; and it is to be hoped that the committee will have his valuable co-operation.

Of Business Value.

Recently the leading authority in the United States on the subject made the unsolicited statement that this paper had "in all the States of the Far West and the Pacific slope, consisting of California, Oregon, Washington, Idaho, Montana, Wyoming, Colorado, New Mexico, Arizona and Utah, the largest circulation credited to any publication devoted to engineering and mining." On the same subject the same unquestioned authority said: "Among the engineering and mining papers in California, none has credit for so large a regular issue as is accorded to the MINING AND SCIENTIFIC PRESS. In fact, it fully equals five times the combined issue accorded to all others." The same authority also said: "Character advertising pays the investor best. It is not the extent of the circulation of the paper, but the class of people who read it. Class journals reach a particular set of individuals. If it is a mining and scientific publication its circulation must necessarily be among that class of readers who are engaged in mining and kindred occupations. Advertisers have begun to realize that quality and quantity are co-existent in a good medium ; and that a few who are probable buyers are better than the multitude who are not. Any sensible man knows that one gold pin is worth twenty brass ones, but it is only recently that the bulk of advertisers have come to appreciate the same idea as applied to newspaper circulation."

It is very flattering to this paper to have the leading authority on the subject in this country show that the MINING AND SCIENTIFIC PRESS excels in the quantity and quality of its circulation, thus giving the two very best reasons that could be given why advertisers should patronize its columns, and this paper appreciates the compliment for two reasons—first, because it is the simple recognition of the truth, viz., that an advertisement in this paper is seen by thousands of probable customers—and not solely by a hundred competitors; and, second, because no amount of money proffered the publication making the statements quoted herein would induce them to make such an assertion unless it was known to be the truth.

In these days of activity in the mining world such indorsement has a business value to this paper which is worthy of editorial notice.

Report of the Geological Survey.

The sixteenth annual report of the United States Geological Survey just published shows that the districts in which timely work on the part of the survey would do most good have received due consideration. Director Walcott has introduced a marked change in the policy of the survey in order to bring it more in touch with some of the economical and educational interests of the country. A very important step taken has been to make reconnoisance surveys of regions supposed to be rich in economic resources in order to obtain information which under the ordinary plan of waiting for a complete survey would be delayed for years. Of the good work done in this direction during the past year or more in the new mining districts we have spoken before.

The mining States have fared very well, considering the meager appropriations that have been made by Congress for the work of the survey. Of the amount expended for topographic work, $159,200, California and Colorado each received $20,000, South Dakota $10,000, Idaho $5000, Washington $5000 and Oregon $10,000—in all about half of the total. Of the amount spent on geologic work, nearly as large a proportion went to Western mining districts.

The appropriation made by Congress for 1894-5 was but $421,000—surely a very small sum for the purpose in such a large territory as the United States. Considering the amount spent, the Survey has done a great deal of good, and this should be a strong argument before Congress in favor of an increased appropriation. Now that it is proposed to undertake a systematic geologic survey of this State, it behooves our representatives and senators to do what they can in that direction, for good general work such as is being done by the United States Geological Survey will be of the greatest value to a State survey.

Concentrates.

A NEWSPAPER is to be started soon at Randsburg, Cal.

THE trial of the cyanide patent cases in South Africa began Feb. 15, '96.

EX-SENATOR DORSEY says that work on that 100-stamp mill will soon be begun at Picacho, Cal.

PROMISING copper deposits have been discovered in the Portis district, Humboldt county, Nevada.

THE United Verde copper mine at Jerome, Arizona, produces about 80,000 pounds of copper daily.

SOUTH DAKOTA'S mining inspector estimates $7,000,000 as the aggregate gold yield of that State for '96.

A RECENT thirty days' run of the Fortuna 20-stamp mill, near Yuma, Cal., turned out $93,500 in gold.

SOME of the business men of Needles, Cal., are making a move to secure a 100-ton smelter at that point.

THE Redlands, Cal., *Citrograph*, says "we have six manganese deposits in sight, and can furnish all the manganese desired."

THERE had been shipped up to Dec. 1st, from the mines and smelters in southern Kootenay 26,717 tons valued at $2,979,347.

THE Rossland, B. C., *Miner* began the publication of a daily edition on the first of December. This is the first daily in the district.

THE new shaft at the Utica mine in Calaveras county, to be sunk 2000 feet, will be 14x5 in the clear, comprising three 4x4 compartments.

W. R. RUST, of Tacoma, Wash., says he will shortly begin the erection at Vancouver, Wash., of a new smelter of a daily 250-ton capacity.

THE Virginius mine at Ouray, Colorado, was closed down last week by a strike of the miners caused by a dispute with the shift bosses.

CAPTAIN A. H. WARD of the Mariposa Electric Company has returned from the East and says that his company will soon go on with its work.

COLORADO'S gold output last year exceeded that of silver. This year it is thought the difference will be even greater in favor of the former.

THE Needles *Miner* claims that the Cedar Valley Mining Company are saving 95 per cent of the gold and 85 per cent of the silver of their ores.

A NEW stage road from Mojave to the Randsburg mines, thirty-five miles in length, has been opened. The old road was fifty-four miles long.

THE total yield of the Comstock from 1859 up to 1891 was $338,444,658.97 from ore. Of this $197,674,079.69 was silver, and $140,771,979.28 was gold.

ARTICLES of incorporation of the London Gold Tunnel Company have been filed in Shasta Co. It is to work the London gravel mine in the Centerville district.

IT is reported that the Government has granted the G. V. & N. road a right of way across San Carlos Reservation and that a line will soon be run into Globe.

THE Eclipse, or Luxe mine, seventy miles from Phœnix, in the Bradshaw mountains, Arizona, is the only exclusively silver mine now being operated in that Territory.

SAN DIEGO announces that a representative of the Exploration Company is examining the La Paz, Encarnation and Espiritu Santo copper mines in Chihuahua, Mexico.

EACH U. S. mail trip from Juneau to Circle City, Alaska, costs the Government $500: six trips are annually made. On the first trip 1474 letters were carried to Circle City.

A CHICAGO company is erecting a mill near the petrified forest at Holbrook, Arizona, to crush the stone to be shipped to Chicago and converted into a substitute for emery in grinding.

THE Pacific Company has been organized under charter from the Legislature of Virginia, with a capital of $20,000,000, to open up mineral deposits in northern Peru, principally coal.

THIRTY days is allowed after completion of the required amount of work or improvement on an unpatented mining claim in which to file affidavit thereof with the county recorder.

OF all present businesses on earth or off it gold mining is the only one in which there is no competition: that is gold mining: which is entirely distinct from disposing of mining shares.

THE delinquent assessments on mining companies represented in this city aggregated $1,543,600 in '94; $1,261,216 in '95. This year the aggregate delinquency will be about one million.

SUPT. SPEER, of the Colton, Cal., Cement Co., says if guaranteed 1000 tons of ore he will build a smelter there. Adam Thompson, Nanaimo, B. C., offers a subsidy on a similar proposition.

THE Golden Reward Mining Company, in the Black Hills, Dakota, have decided to build a matte smelter of 200 tons daily capacity, and the Union Hill Mining Company contemplate erecting a 100-stamp mill.

BRADSTREETS' reports of bank clearances for October show for Helena, $2,368,921; Seattle, $2,470,849; Tacoma, $2,657,189, and Spokane $2,864,252. Spokane and Helena are smaller towns, but they are mining centers.

THE Black Oak mines of Tuolumne county have been sold to the Franco-Belgian syndicate for over $300,000. Charles H. Meyer and Leopold Meyer, who represent the syndicate, have under consideration other properties.

A WOMAN in Siskiyou is developing one of the widest ledges in the State. She is Mrs. N. E Hilt of Coles, who is working the North Star mine, on Siskiyou mountain. The ore in a 21-foot ledge, it is claimed, runs from $7 to $22 per ton.

ONE silver shipment to Europe—that of the steamship St. Paul from New York on the 2nd inst., aggregated 600,000 ounces, besides 30,000 Mexican dollars. In the matter of silver Europe and Asia have not lost their absorbent power.

IT is estimated that there are over 400 men at work on the streams running into Kings river in Fresno county, making small wages washing gravel. Lately a hydraulic giant was shipped to the district, the first that has ever gone to that part of the State.

THE presidential election for a successor to Grover Cleveland will be held on Jan. 14th, 1897. There will be 447 votes cast by the electors at their several State capitals, of which Wm. McKinley of Ohio will probably receive 272 and W. J. Bryan of Nebraska 175. The result of the January election will be officially announced by Vice-President Stevenson in the presence of both houses of Congress four weeks after the meeting of the forty-five electoral gatherings.

THE Santa Fe Railroad has organized an industrial bureau to encourage industrial enterprises near its routes. If the Southern Pacific would do a little in this direction it would accomplish something toward making itself less unpopular and increase its business.

THE copper mines about Butte, Montana, have been for some time past worked to their fullest capacity, and the output has been large: but, with the opening up of new mines, it is claimed that next year's yield will be considerably larger than that of 1896.

SUIT has been brought by Alvinza Hayward and others, owners of the Rawhide No. 2, against the Rawhide Gold Mining Co. for damages in $200,000. The plaintiffs claim that ore to that value has been extracted by the defendant company from the Rawhide No. 2.

THE recent ruling of the General Land Office as to what may be located as placers is causing trouble in Colorado, and the papers there are waking to the necessity of the passage of a bill, such as was proposed by the MINING AND SCIENTIFIC PRESS, to remedy the evil.

AT the Eureka Hill mine, at Tintic, Utah, it is reported that there is in the bullion vault of the mill over 63,000 pounds of bullion, nearly 40,000 pounds of the total being copper and the balance silver. At the present market price the value of the silver in the bullion is computed at $239,300.

THE November output of Cripple Creek was the largest in the history of the camp. This speaks well for the district, considering that some of the largest mines have not produced their usual amounts. It is still claimed that the year's output will very nearly if not quite reach $10,000,000.

WHILE the great discoveries of British Columbia have been overshadowing, there has been a great deal of activity in mining on this side of the line in Washington and Idaho during the past year. The development work alone gives promise of a large increase of yield during the coming year.

LETTERS from New York received in Deadwood, South Dakota, assert the sale of the properties under the Homestake management for $35,000,000. The sale, according to these letters, includes all the mines and mills in Lead, Terraville and Central. The Homestake has paid over $6,000,000 in dividends.

IN West Kootenay, B. C., in 1895, over 3000 claims were registered, and the output amounted to about $2,100,000, while for the first six months of 1896 it amounted to $2,200,000. The Director of the Canadian Geological Survey predicts that the mineral wealth of Canada to be developed will not fall short of that of the United States.

ALASKA has no bank. Alaska merchants keep their main deposits in this city, and issue personal checks upon those deposits. Such checks are generally accepted all along the coast as the equivalent of drafts. If a Juneau merchant has to pay a bill in New York he buys an Alaska-Treadmell mine check, which is good almost the world over.

A NEW MEXICO miner writes renewing his subscription that he takes the paper "mostly to read the advertisements in it every week." He probably has no intention to be sarcastic, but doubtless partly voices the sentiments of a good many others who take the paper for all the valuable information weekly found therein, including the advertisements.

ALMOST as many new mining papers have been started in '96 as were begun in '95, illustrating the great activity in the mining industry. Some of them are doing good work, others show a tendency to be influenced in a way that is fatal to the life of a mining journal whose existence is measured by its earned reputation and the confidence of the mining public.

THE Victoria *Times* says that 731 West Australian mines with an aggregate capital of $380,000,000, and with an aggregated ividend of $1,105,000 to their credit are listed in London. On the other hand, two Trail Creek mines with a capital aggregating $3,000,000 have paid $412,000 in dividends, yet Trail Creek stocks are totally unknown to the same stock exchange.

THE director of the North Gippsland, Australia, School of Mines states that "taking the returns of North Gippsland, we find the number of ounces extracted from 46,850 tons of quartz was 46,057 ounces. From an exhaustive examination of tailings I can safely say the loss has been over 8 dwts. per ton, or a total of 18,740 ounces, the value of which would be about £75,000—an enormous amount to be leaking away annually."

THE British Columbia *Mining Record* has editorially discovered that it has incurred the displeasure of those whose mining plans it has criticised. Our contemporary will also discover that it will likewise incur the displeasure of those whose fraudulent mining plans it refuses to favor or continues to expose. Such displeasure will, however, be the *Record's* best claim to the support and favor of legitimate mining enterprises.

A TELEGRAM from Casper, Wyoming, states that the Cudahys of Chicago have bought 300,000 acres of land in the Wyoming oil region and the refinery at Casper and will begin an active opposition to the Standard Oil Company. Some time ago these lands were secured by a Pennsylvania syndicate, and several wells were drilled and the Casper refinery erected. The finished product was, however, never put on the market, the company alleging that the railroads discriminated against them in freight rates.

AN attractive scheme for robbing the unwary has lately been worked in Chicago as a mining investment. A western gold mining company wanted $40,000 to develop its plant. To obtain this it issued stock for $200,000 on which a dividend of 8 per cent was guaranteed for ten years. The guarantee was made through a Chicago bank, the stock being sold at par. The bank withheld 80 per cent of the amount received for the stock or in all $160,000, remitting to its client, the mining company, the $40,000 required to develop the mine.

IN early days there were few livelier mining districts in northern California than "over on the Salmon" in Siskiyou county, with Sawyer's Bar as a center. In time the bars were worked out and the district became little more than a memory. But for one large mine worked in the seventies by an English company—the Black Bear—there would have been very little output of gold. However, in time the larger deposits of gravel began to be opened and in 1893 there was enough business to induce the building of a wagon road over the mountains from Scott Valley, thirty-five miles away. Now a telephone line has been built, and it is proposed to continue the wagon road down the Salmon toward Humboldt. Yet over on the Salmon there is almost absolutely no industry except mining, and ten years ago the old settlers said that mining was played out. It will not be surprising to hear of an electric railroad being projected from Siskiyou to Humboldt bay in the near future, for there is no part of the State where water power for generating electricity may be found in more abundance. A similar story may be told of many another mountain district in California.

DIRECTOR OF THE MINT PRESTON in his annual report says there is no doubt that the silver coins of the United States are now being counterfeited exactly similar to the genuine, size, weight and devices. Some of these coins cannot be distinguished from the genuine, even by experts. One counterfeit silver half dollar has made its appearance in the East and West, the weight of which is 192 grains, with a fineness of 867¼, while the weight of the genuine is 192.9, of the fineness of 900. The profit to the counterfeiter is now nearly 100 per cent.

AN incorporation has been formed in Salt Lake with a capital of $50,000, divided into 500 certificates of a par value of $100 each, and it is the aim and intention of the company to secure a list of 500 members, each of whom will hold one certificate of stock, and no member will be allowed to own or hold more than one certificate. The fund accumulated by the sale of these 500 certificates will be used only in the purchase of mining properties, for the development of which each member of the association will be assessed $2 a month. Such associations might well be formed by business men and miners in the camps along the mother lode for the purpose of investing in and developing mines at home.

NOT alone on this coast has the cost of mining ore been reduced. In other localities the handling of ore has been so systematized as to produce results that as published seem almost incredible; yet they come from so reliable a source as to deserve notice. In the Lake Superior country at the Olivet is probably the greatest of the Mesaba steam shovel mines. Figures from Duluth show the mine to have run its 810,000 tons of this year's output for about 6¼ cents a ton, exclusive of stripping, which is set down at not over 3 cents on a total ore body to be mined by the shovel. The management of the mines has determined to mine their entire ore body by steam shovels, and it is not considered necessary to make provision for any change to either milling or other underground process later. Ore will be raised out of the mine, when its levels have been sunk too far for present methods, by pneumatic elevators or stationary engines for lifting the loaded cars to the surface, or by running switchbacks or circular tracks down the mine. It is stated that some of the largest and best managed Mesaba mines operate underground by the caving process have shown cost sheets this year of not far from 40 cents per ton, including everything. These figures are vouched for by a reliable mining engineer in that region.

GEORGE H. EVANS, general manager of the Golden Feather, Limited, of Butte county, says: "We have cleaned up after a run of 130 feet of bedrock. Delayed through elevator accident four days. The rain has been excessive; claim flooded. Cleanup amounts to $575—only old workings. There is every prospect of improvement next cleanup. It is evident that the Cape Union people in their two seasons' work, and with the number of other people they leased the portions of their claim to, worked all of that claim thoroughly, but the Cape people did not lease any portions to others and only worked one season, and I am satisfied—so is Smith, the foreman—that at least 3000 or 4000 feet of good river remains above us untouched on the flume side, and, of course, some portions on the other side. It is easy to talk now, but we ought to have commenced this season where we are now, and then a different tale would have been told. I am willing to subscribe towards raising sufficient funds to put us in the river, should we not have time enough this season to take out all that is needed, so anxious am I to show the directors that the 'stuff' is in the river, and I feel more confident now than ever before. I have to alter my pipe line, and bring it down a different place next year, as we are so far up the river. I will lay it on a line about half way between where it is now and the head dam. Will also have to shift the dynamo house, and no further expense will be necessary for new plant."

A NOGALES, Arizona, subscriber asks: "It is proposed to leach carbonate copper ore with sulphuric acid and deposit the copper by electrolysis, regenerating the principal part of the acid. Experiments on a small scale have been very satisfactory. What amperage would be necessary in a generator to deposit 2000 pounds of copper from a solution of 4% to 10% 'bluestone' in twenty-four hours? What material for anodes is most satisfactory as regards price and convenience (carbon, sheet lead, platinum)? What would be the most convenient size for tanks; how many? What form and size should the anodes and cathodes be; how connected and how close together? What voltage should this generator have connected with such connections, and what horse power would it consume, theoretically?" These questions are somewhat indefinite, as, for instance, the first, as it depends altogether upon the series—that is, the times the initial amperage is used in the series. Answering the first, it is to be said that a generator of 100 amperes through a series of 320 vats or plates will, theoretically, deposit 2000 pounds of copper per twenty-four hours from a sulphate solution and nearly twice as much from a chloride solution; or 320 amperes through a series of 100, etc., which would be more convenient. The per cent of Cu or bluestone would only mean an increase or decrease of surface; with 8 per cent of Cu it would necessarily be about 10 feet. Regarding the second: if sulphate is used, and, of course, insoluble anodes are meant, lead is best, otherwise carbon. Third: With leachings from carbonates the vats should be small, that the slime deposited from aeration of such a solution could be cleaned out without disturbing too much of the series. The most convenient size would be not over 4 feet square on each end and from 5 to 8 feet length, if simple series is used, and longer, say, 15 feet, if tandem series; in simple series, 200; tandem, from 30 to 50, according to resistance of liquor, etc. Anodes 36x40, or thereabouts, or with common series each can be composed of smaller pieces; with series the center vats positive and the end vats of each series of 100 negative. With tandem, each series parallel, or multiple. Fourth: Any voltage, according to surface or resistance, but 125 is very convenient and suits the plate surface above mentioned. Fifty H. P. You are probably aware of the rule that any horse power deposits a given amount of copper, according to surface exposed, etc.

Nevada City District Geology.

The United States Geological Survey has just issued in a special folio maps and descriptions of the geology of the mines about Nevada City and Grass Valley that form one of the most valuable contributions ever made to the geology of this State. The following are extracts from the articles written by Waldemar Lindgren:

Throughout the Sierra Nevada there is one sharp geologic distinction to be drawn: it is the difference between the older rocks—the "Bedrock series," as it is usually termed—on one hand, and the "Superjacent series," or the much younger gravels, sands, clays and volcanic rocks, on the other hand. The Bedrock series consist of highly altered sedimentary rocks, crystalline schists and older igneous rocks, on which the Superjacent series lies in approximately horizontal position. The rocks of the former series have been subjected to repeated orographic disturbances, and to a great extent have been compressed, broken and crushed by these forces. The rocks which are now at the surface were once below it, probably thousands of feet; successive uplifts and constant erosion have removed the upper parts of the rock masses and exposed those once buried in the foundations of the range. Rightly to understand the geology this fact must be borne in mind, and the relation of the younger to the older series must be remembered.

Earlier History.—While it is comparatively easy to unravel the later (Neocene) history of the Sierra Nevada, the same cannot be said of the immeasurably longer periods preceding it. They included successive epochs of quiet sedimentation, when the ocean covered the place where the range now rises; several distinct epochs of intense volcanic action, when the lavas built up mountains of igneous masses; and other epochs during which mountain-building forces lifted and crushed together these sedimentary and igneous products. In these compressed and crushed masses occurred enormous abyssal intrusions of coarse-grained, granitic rocks. Animal life, on the remains of which we depend for the identification of the sedimentary formations, was unusually scant during the intervals of deposition, or most of the fossils were destroyed during the metamorphism which the rocks have undergone. Many parts of the Sierra Nevada have, indeed, the aspect of pre-Cambrian complexes—the oldest known—though, from the evidence available, it is certain that the rocks of the range in general are of much younger age.

The Nevada City and Grass Valley district is located in the upper foothills, near the line where the old igneous rocks of the foothill region give place to the wide belt of slaty, sedimentary rocks of the middle range; east of this sedimentary belt the granitic rocks of the highest parts of the range begin. High ridges of fine-grained, dark-green rocks, diabases and augite-porphyrites, form the first foothills of the Sierra Nevada in Yuba and Nevada counties; in the latter county these rocks extend to near Anthony House and Indian Springs, where they are replaced by a belt of coarser-grained granitic rocks (granodiorite, and gabbro), which terminates along a line drawn by French Corral, Rough and Ready and Wolf Creek mountain. Eastward of this line, up to Nevada City and Grass Valley, the geology is very complex; relatively narrow belts of more or less metamorphosed sedimentary rocks, standing at steep angles, alternate with large quantities of fresh or metamorphosed igneous rocks. Near Nevada City this complex is separated from the predominatingly sedimentary slates to the east by the rounded southern end of the great intrusive granodiorite mass extending more than twenty miles northward into Butte county. In the southern part of Nevada county the diabases and porphyrites of the foothills extend very far eastward, and an area of these rocks reaches northward, including Osborne hill, to the east of Grass Valley.

The region of complicated structure begins at Rough and Ready, five miles west of Grass Valley, with amphibolites and gabbros; then follows a belt, from one-fourth of a mile to 1½ miles wide, of sedimentary clay-slates and siliceous slates, which, near the North Star mine, enters the Grass Valley tract. A branch of these slates is deflected to the southeast and traverses the northeastern part of the Grass Valley tract. Between Grass Valley and the main clay-slate belt lies a body of diabase and porphyrite about three-fourths of a mile wide, the continuation of which northward, though broken for a short distance by intervening slate masses, is found west of Newtown. East of this diabase belt lies the Grass Valley area of granodiorite, five miles long, a rather narrow body of coarse-grained, granitic rock, the northerly end of which is found in the city of Grass Valley. Eastward of this comes the great porphyrite and diabase area of Osborne hill, limited again by the above-mentioned streak of sedimentary slates cutting obliquely across the Grass Valley tract.

The greatest complication is found between Nevada City, Newtown and Grass Valley. Within this area the rocks may be divided into three groups: (1) The two narrow belts of siliceous clay-slates with steep dip, one following the contact of the Nevada City granodiorite area for a long distance, the other imbedded in porphyrites one-fourth of a mile eastward. (2) The diabases and porphyrites, occupying a considerable area to the south of Nevada City and continuing down to the vicinity of the Maryland mine. These dark-green, fine-grained rocks form pointed areas running out northward; the largest, adjoining the first-mentioned slate belt, comes to a point about three miles west-northwest of Nevada City. (3) The diorite-gabbro-serpentine complex, beginning north of South Yuba river, forming a lenticular mass nine miles long and not over three miles wide, and running out in several points a short distance east of Grass Valley. The largest part of the latter area consists of a coarse-grained, lighter or darker green diorite or gabbro, or a rock intermediate between the two. In it lie several lenticular masses of serpentine, usually running out to sharp points; the road from Nevada City to Newtown crosses the two largest of these serpentine masses. Less altered pyroxenites and peridotites are found in or near the serpentine. There is excellent reason for believing that all of the rocks of this complex are of similar age and origin.

Turning now to the more interesting question of the relations of all these different rocks, it should be stated that no fossils have thus far been found in the sedimentary rocks of the district. The greater part of the latter have been referred to the Calaveras formation, which embraces the Paleozoic sedimentary rocks of the Sierra Nevada. Among the Paleozoic rocks the Carboniferous strata doubtless predominate, but the paucity of fossils has permitted identification only at relatively few points. The determination of the rocks in question as "Calaveras," therefore, rests on circumstantial evidence only, and this evidence consists partly in their lithologic similarity to beds determined farther south, near Auburn, and partly in their position in the prolongation of these strata northward. These slates of the Calaveras formation are probably the oldest rocks in the district. During a mountain-building disturbance toward the end of the Paleozoic or the beginning of the Mesozoic, these beds became folded and compressed. This earliest uplift was associated with the outbreak of igneous rocks, which, indeed, in some localities took place even during the deposition of the Carboniferous beds, but of those igneous rocks there is no positive trace in the region under discussion. It is believed that all of the igneous rocks of Grass Valley and Nevada City are post-Carboniferous, and probably none of them antedate the end of the Juratrias period.

During the last portion of the Juratrias period a large part of the Sierra Nevada was a land area; part of it, however, was submerged, and in that sea the latest sedimentary division of the Bedrock series—the Mariposa beds—was deposited. These are black, carbonaceous clays, interbedded from the thirty-eighth parallel northward with volcanic tuffs, which shows that during their formation volcanic forces had already begun to act. A narrow belt of black clay-slates, interstratified with elastic, volcanic material, beginning about 2000 feet west of the Champion mine and thence running southeasterly by Towntalk and the Merrimac and Washington mines, has been determined as belonging to the Mariposa beds. The slates are much less altered than those of the Calaveras formation, possess great similarity to the well known Colfax beds, and, while not directly connected with them, lie in their natural continuation to the northwest. Though not absolutely certain, this identification has a very great degree of probability. After the Mariposa epoch followed a time of the most intense mountain-building disturbance, accompanied by the outburst of an enormous quantity of igneous material of different character and texture. The younger sedimentary rocks were folded and compressed and welded with the older series of the same kind, while intrusive masses were injected in them far below the surface, and volcanoes with thousands of feet of lavas and ash masses were built up on the surface along what are now the foothills of the range. The diabases and the porphyrites, as well as the diorite-gabbro-serpentine series, belong to this volcanic period, the former as partly surface flows and dikes, partly deep-seated intrusive masses; the latter entirely consolidated as coarse, granular rocks far below the surface.

Finally, as the last and farthest-reaching phase of that period of igneous activity, came the intrusion of the large granodiorite masses in the then deep-seated part of the range. This took place on so gigantic a scale that the mind strives with difficulty to comprehend the mechanics of the process. Thus, the granodiorites of Nevada City and Grass Valley are the most recent rocks of the Bedrock series. Finally, after the intrusions of the granodiorite, dynamic forces, acting on the mass with different intensity and in different directions, produced fissure systems in which auriferous solutions ascended and deposited their contents. This forming of the mineral veins was the last phase of the Mesozoic revolution in the Sierra.

By no means all of the rocks of the district are now in the same condition in which they were formed. Successive dynamic forces have acted on many of them, producing deformation and schistose structure. Chemical forces have acted on them in at least three distinct ways, changing their mineral constituents until their original form is sometimes scarcely or not at all recognizable: first, as a result and concomitant of dynamic metamorphism; second, by the heat and mineralizing exhalations of the intrusive granodiorite; third, by the action of the hot auriferous solutions on the rocks adjoining the fissures through which they circulated.

The Mineral Deposits of Eastern California.

Written by HAROLD W. FAIRBANKS.

Introduction.—The portion of California lying east of the crest of the Sierra Nevadas has a mineral character which in many respects is quite unlike that of the rest of the State. Very little has been published about the ore deposits occurring here, although they are quite important economically and strikingly interesting from a mineralogical point of view. The area is bordered on the west by the Sierra Nevada mountains and is traversed in a general north and south direction by high and rugged ranges, between which lie the desert valleys.

Types of Ore Deposits.—The important ore deposits can be divided into two classes: (1) Gold, (2) silver and lead. Of the silver ores two distinct classes may be considered: (*a*) Argentiferous galena, generally in the form of chamber deposits; (*b*) silver-bearing sulphides of antimony, arsenic and copper, occurring in well-defined veins with a gangue of quartz.

As a rule, each of these classes of ores is strongly marked in its manner of occurrence, although there are important exceptions. Almost all the gold deposits contain silver in appreciable quantity, and at times the value of the two metals is nearly equal. The important silver deposits, on the contrary, contain very little gold.

Distribution and Geologic Relations of the Gold Ores. Commencing in the southern portion of the area in question the important gold districts will be briefly described.

Near Postoffice springs, in the Panamint range, gold is found in quartz veins inclosed in limestone. This rock, exposed in immense cliffs on the south side of the canyon, has been folded in a syncline with slates below and on the sides. The ore is high grade, the gold being present on the surface in the free state; but judging from the appearance of the quartz, it was originally contained in iron pyrites.

A large number of gold-bearing quartz veins are scattered through the southern portion of the Argus range. They are inclosed in a great body of granite which extends from San Bernardino county north through the Coso mountains to Owen's lake. The character of the quartz makes it seem probable that some distance below the surface most of the gold will be found contained in iron pyrites. Chalcopyrite and galena are abundant in some of the veins and carry considerable silver.

With the exception of numerous areas of volcanic rocks, the Coso mountains consist wholly of granite, the mineral deposits being confined to the latter rock. The quartz veins are characterized by the presence of free gold on the surface, while at depths varying from 250 to 400 feet the free gold has been found to be largely replaced by iron pyrites with a subordinate amount of chalcopyrite.

In the Beveredge gold district, on the eastern slope of the Inyo range at an elevation of 5000 to 8000 feet, the veins are confined to a large body of granite which has broken through the metamorphic series. Many of the veins are nearly vertical, while others are quite flat, dipping 20° or less, and being locally known as blanket veins. The mine which has been worked the longest and most steadily is known as the Keynote. A depth of 700 feet has been reached on the incline, and the ore, which was free milling on the surface, has been found with increased depth to contain a greater proportion of iron pyrites and chalcopyrite. In the American Flag mine, at the southern end of the district, gold is found associated with galena and even imbedded in it. The Chilula mine lies partly in limestone and partly in granite. The portion of the vein in granite carries gold; but upon passing into the limestone, the gold is replaced by silver ores. This seems to be a good illustration of the physical influence of the wall upon the ore. One of the largest veins of the district dips at an angle of about 20° into a precipitous granite ridge. Where it has been opened the average thickness is 4 to 7 feet, swelling in places to 20 feet.

A number of small but rich gold-bearing quartz veins are found on Fish Spring hill, a granite outlier of the Sierra Nevadas. There are two systems of veins here—the one vertical, the other nearly flat. As far as developed, the quartz of the district shows free gold with copper and iron sulphides.

A group of veins carrying gold and silver occurs in limestone at the western base of the Inyo range, southeast of Independence. The gold is associated with quartz and iron and copper pyrites, while the silver is contained in galena which occurs in bunches in different portions of the vein.

A quartz vein is found in granite in the foothills of the Inyo range north of Independence. It has a vertical position and is traceable for nearly a mile. The character of the quartz makes it apparent that the gold was originally contained in iron pyrites.

Beginning at a point east of Bishop creek a gold

belt extends northward along the western slope of the White mountain range for about ten miles. This belt is interesting because of the great variety in the character of the ore and wall rocks of the many different veins. At the southern end are a number of small veins in granite, two sets of fissures being distinguished—one vertical, the other almost flat. The gold which is free on the surface is mostly confined to the latter series of veins. One mile northward is the Polita mine in limestone. The deepest workings show a soft, decomposed ore, rich in hydrated iron oxides and containing but little quartz. Two miles farther on are some small veins in slate with the usual quartz gangue and sulphurets. Four miles north of the Polita mine there are several veins in slate. One—the Southern Bell—extends east and west across the strike of the slates. The ore is very similar in character to that of the Polita, showing much iron oxide and little quartz. Six hundred feet farther up the mountain in the same slates there are two very small but rich veins with the usual quartz gangue and iron and copper pyrites.

In the mountains west and southwest of Benton there are many gold-bearing quartz veins. As a rule, the gold is associated with pyrites and other minerals, which makes its extraction difficult. In some mines there is a notable quantity of galena and other silver ores. The country rock is granite.

A large number of gold-bearing quartz veins are found scattered along the scarp of the Sierra Nevadas near Mono lake. These are mostly in metamorphosed sedimentary rocks. The most important mine is the Golita, where there is a body of ore 50 to 70 feet wide, lying between limestone and a porphyry-like rock. Gold and silver both occur here in nearly equal proportions.

A very interesting group of gold mines is that on Mount Scowdan, south of Mill Creek canyon and near the summit of the Sierra Nevadas. This mountain rises to a height of 11,500 feet, being composed of granite except on the northwest where there are bodies of quartz porphyry and silicious metamorphic rocks. The mountain is seamed by quartz veins on three sides. Some stand vertically on its very summit, while others outcrop on the steep canyon walls, dipping in at an angle of 30° or less. While the greater number and more regular veins are in granite, there are some in the porphyry and metamorphic rocks. The ore from all the veins in the granite is quite similar. The gold is found free in the superficial workings together with a little galena. In the deepest workings of the May Lundy mine the free gold disappears and its place is taken by iron pyrites. Next to Bodie, this is the most important gold district east of the Sierra Nevadas.

Bodie has been the great center of gold mining in eastern California, more than $20,000,000 having been produced there. The gold-bearing veins are unique in many respects. Their period of formation followed the volcanic activities of Tertiary time, and in age as well as general character they differ markedly from the other important gold deposits of California. The inclosing rock is hornblende andesite, which covers an extensive area north of Mono lake and seems to belong to the same period of eruption as the andesites along the summit of the central and northern Sierras. The most important thing about the Bodie ores is, however, the fact that the veins ceased to be profitable below 700 feet. The veins are divided into two classes—an older easterly dipping one and a younger, nearly vertical or inclined at a high angle to the west, one series faulting the other. The veins of the Syndicate mine on the north are beautifully banded, with the appearance of having been formed in open fissures by successive layers from the walls inward. They became unproductive at a depth of 250 feet. The Standard mine next south shows a still larger number of veins, varying from exceedingly thin seams, which are very rich, to an extreme width of 90 feet. The latter vein has an average width of 20 feet, according to Whiting, and constitutes the most important ore body. In the Standard mine the veins became smaller and almost barren below the 500-foot level. In the Bodie and Bulwer mines on the south the ore bodies extended to a somewhat greater depth.

Argentiferous Galena.—Important deposits of argentiferous galena have been worked at Cerro Gordo, Darwin and Modock in Inyo county. The ore occurs generally in limestone in chamber form, although occasionally it assumes a vein-like character. The Modock mines on the eastern slope of the Argus range illustrate well the characteristic manner of occurrence. A great thickness of limestone forms the eastern slope of the Argus range between Darwin and Modock, and in many places it has been more or less mineralized, as shown by the bright yellow and red surface tints. The Modock mines are situated on a hill one-half mile in diameter, terminating a spur of the range. The central portion of the hill is filled with chamber deposits of galena rich in silver. These are scattered in such an irregular manner that no systematic method of development can be undertaken. Some are found by following minute stringers of ore or slightly mineralized country rock, while others are located by chance. The hill has been opened to a depth of 1150 feet, at which level the richest ore was found.

(To be Continued.)

The Storage of Water in Earthen Reservoirs.*

By SAMUEL FORTIER, M. Can. Soc. C. E.

(Condensed.)

Earth dams are composed of varying proportions of gravel, sand, silt, clay, organic matter and water. The same ingredients which constitute the cultivated fields and their underlying strata are in nearly every case the most convenient also the most suitable materials to use. A consideration, therefore, of the nature of the materials forming a reservoir embankment leads us directly to that of soils and subsoils. For this purpose the physical and mechanical properties of soils are of much importance. It is essential that we know the size and weight of the grains, the amount of air space they enclose, the percentages of air and water contained in these open spaces, and the effects produced by moisture, heat and frost, as well as the action of such forces as gravity, capillarity and evaporation. To such an extent is this true that one might say without exaggeration that the success of works of this character rests mainly upon the fact that they are designed and built in accordance with an intimate knowledge gained from a close study and carefully made tests of the physical properties of the materials.

The belief is prevalent among laymen and engineers inexperienced in this kind of work that any country road foreman who is familiar with the handling of earth is qualified to superintend the building of earthen dams. They fail to understand the difference between an embankment capable of withstanding a load and one compact and stable enough to retain water. In highways, or railroad fills, little, if any, attention is given to packing the materials. The fill when completed is nearly as porous as the soils and subsoils of which it is composed. When a cubic yard of earth is removed from the pit to the fill its bulk is increased by about 1¼ in sandy soil to 6 per cent in hard clay soil, and the subsequent shrinkage of from 5 to 15 per cent finally reduces it from 90 to 95 per cent of its original volume. But soils and subsoils in their natural state contain from 35 per cent to 60 per cent by volume open space, and the ordinary highways, or railroad fills are thus shown to be porous masses wholly unfit to impound water.

In the building of earthen dams something more is needed than the piling up of a mass of porous materials. The hydraulic engineer who desires to build a safe dam with a minimum amount of earth must attend closely to the following features:

1. The relative size of the grains.
2. The percentage by volume of open space.
3. The proportions of air and water contained in these open spaces.
4. The best mode of filling the interstices between the larger grains with the smaller grains.
5. The best mode of expelling the greater part of the air contained in the open spaces.
6. Making the embankment proof against the action of extreme drouth or excessive saturation.

An embankment formed of gravel would be stable and unaffected by the actions of frost, drought or moisture, but 45 per cent of open space in gravel would allow the water to pass through it. Sand would be more impervious but less stable and more affected by drought and excessive moisture. Soils containing a high percentage of organic matter might make an impervious embankment, but the necessary weight and compactness would be wanting. The same is true of all clays. Clayey soils are often styled heavy soils, but such soils are the most porous and are capable of absorbing large percentages of water. The tendency of clay to swell when wet, and shrink and crack when dry, renders it a treacherous material for reservoir embankments when used alone.

In building a distributing reservoir for Ogden City, Utah, the writer adopted a mode of compacting the materials somewhat similar to that in filling in trenches under water. The materials were, for the most part, fine sand, with an occasional stratum of coarse gravel, cobblerock, clay or silt. The capacity of the reservoir is 7,000,000 United States gallons, width of embankment at flowline 30.5 feet, water slopes one and one-half to one, outer slopes two to one, depth of water 20 feet.

After removing the surface soil a trench from 4 to 6 feet wide and 6 feet deep was dug along the entire center line of the proposed embankment. The base of the embankment was then formed and allowed to slope slightly towards it center. Instead of filling in the trench at once, it was allowed to remain nearly full of water, and it became the origin of a canal in the center of the entire embankment. The most impervious material was deposited on the inner half of the embankment, while the cobblerock and more porous material were deposited near the outer edge. The inner and, to some extent, the outer half of the embankment was built up in layers, moistened and packed in the usual manner. The central portion was built up by emptying the wheelers at each edge of the canal and shoveling the material into the water.

The mode of compacting reservoir embankments, almost universally followed by American engineers, is to specify that the earth shall be spread evenly over the surface in layers of from 4 to 6 inches in depth, then moistened and rolled with grooved rollers weighing from 100 to 300 pounds per inch of tread. In most instances the number of times each layer is rolled is left to the decision of the engineer, but some specify a minimum roller travel in miles for each 1000 cubic yards excavated

Opinions differ as to the amount of water to use. In gravel puddle, or what the writer has termed clay concrete, in which the percentage of clay is small, a large amount of water can be used with good results. This mixture unquestionably makes the safest embankment.

To those who persist in using chiefly clay it may be said that the addition of water to moisten the layers is of doubtful benefit. The effect of water on comparatively dry clay is to increase its bulk, and no amount of rolling will make it quite so compact as it would be if rolled to the same extent in a dry state.

In reference to compacting materials by depositing them under water, as was done on the Ogden reservoir, by means of a canal in the center, the reader will note that this method is applicable only to gravel puddle or clay concrete containing less than 25 per cent clay. A higher percentage of clay would render the embankment so soft that it could not be traversed by team, but the method is particularly well adapted to earth containing either no clay or very little.

It is from practical experience that the writer bases the following conclusions:

1. Earth deposited under water is freed from the greater part of the air confined in the open space.
2. Earth containing grains of different sizes packs better under water than in air.
3. Embankments built of dry earth, or earth moistened and packed, are more liable to be injuriously affected by capillary action than embankments, or portions of embankments, built under water.
4. Making provisions during construction for a canal holding water in the center of the embankment is a practical test, before completion, of the safety of the structure.
5. Most of the advantages of a center core are gained by this mode of construction without the disadvantages of having distinct lines of separation between an earth and a masonry wall.
6. Where water is abundant and easily applied, the middle portion of earth dams can be more cheaply compacted under water than by sprinkling and rolling.

*Trans. Can. Soc. Civ. Eng.

Deep Mining on the Rand, S. A.

In an address to the shareholders of the Consolidated Gold Fields, Limited, in London, John Hays Hammond, in speaking of the future of deep-level mining on the Rand, gave the following interesting data:

The chief obstacles to deep level mining—now I am referring to depths greater than those at present contemplated by any of your companies, say, to depths of 5000 and 6000 feet vertically—are high temperature in the mines and the handling of excessive quantities of water which, sometimes under abnormal conditions, are encountered. Dr. Becker has fully considered the problem with regard to these factors, and I concur in his opinion, as do all the engineers of the Rand who have investigated the subject—namely, that the condition as regards temperature and water are exceptionally favorable upon the Rand. The history of mining upon the Comstock lodes, the famous gold and silver lodes of America, is often adduced as an argument against the practicability of deep level mining on the Rand, but I fail to see any connection between the two. The conditions of the Comstock are briefly these: The situation of the lode is in what is called by geologists a region of recent solfataric action—that is, of dying vulcanism. You might as well compare the obstacles to be encountered in sinking a shaft in the crater of Vesuvius with the Comstock as to compare the conditions of mining upon the Comstock with those upon the Rand. But even upon the Comstock, where I have seen the temperature over 120° in the levels, and where the water was fairly boiling out of the rocks, there were no insuperable obstacles to the engineer; it was not any engineering problem that compelled them to abandon working, but rather the fact that the ore bodies occurred in small pockets entirely dissimilar to those of the Rand, and, as these pinched out, naturally the mining was discontinued. That is the explanation of the cessation of mining on the Comstock, where the most adverse conditions obtained that I know of in the history of mining. Let us see now what is being done upon deep level mines in other parts of the world to-day. In Michigan ore is being profitably stoped from depths of upwards of 4500 feet vertically, and one of the companies which has had extensive experience in mining at these depths has started a shaft to intersect the reef at a depth of 5000 feet vertically, and to begin the extraction of ore below that point, although the value of the copper ore is not more than 26s. to 27s. a ton. So satisfied are they of the feasibility of deep level mining that they are undertaking sinking, prelimi-

nary to mining, from that depth, and no engineer who has investigated the subject has the slightest misgiving as to the success of that mining operation. Then at Pribran, in Bohemia, almost at your own door, you have an example of deep level mining. I had an opportunity of visiting the place a few weeks ago, and I found a very satisfactory state of affairs. They are mining at a depth of 3600 feet, and the temperature of the working is not over 76° Fahrenheit, but the temperature never rose to over 90°, even before the circulation of air was established by connecting the drives and shafts. I think you will admit that the engineering skill upon the Rand is able to cope with engineering problems solved in Michigan and Bohemia. Now we come to the question: Will deep level mining pay? I shall answer this question by pointing out to you in what respect we know that deep level mining will be conducted at economical disadvantages contrasted with mining upon the outcrop companies. First, the cost of the deep level shaft, as I have previously pointed out to you, will involve extra outlay, and, of course, heavier machinery will be necessary in depth, but we have carefully examined the question, and we find that, allowing about £1200 per claim, where the company consists of an amalgamation of something like 250 claims, we shall more than cover the extra initial expenditure involved in the deep level mining. When I tell you that from some of these claims we expect to receive at least £15,000 profit, and from many of them £25,000 to £30,000 profit, you will see that it is not a very momentous or valid objection as to deep level mining. When the reefs are once reached the exploitation commences, and the extra expense connected with mining would be due to excessive temperatures and to the handling of great bodies of water, which conditions will not exist upon the Witwatersrand to the depth at present contemplated by your companies. However, these extra expenses may be summed up by saying that more power will be required, and more power means more coal, nothing more nor less. At the present price of coal, this extra cost of power should not exceed 3d. per ton per 1000 feet of haulage, which is not a very serious matter. In the immediate vicinity of your mines there exist illimitable coal deposits, and, therefore, we think it is only reasonable to expect that by competition, which is bound to follow, and by the promised reduction of railway transportation, we shall get coal at a very much less figure than we are paying for it to-day; and we really expect that the item of coal will be less per ton of ore mined, when we shall require large quantities, than we are at present paying for it. The history of deep level mining universally shows a decided tendency in the decrease of the operating expenses. We are confident that the economic conditions of mining will improve; that labor will become cheaper, or, what is equivalent, more efficient; that the cost of supplies will be reduced; that the efficiency of mining and metallurgical methods will be increased, and we, therefore, confidently believe that we shall be able to mine at depths of from 3000 to 4000 feet at an expense not to exceed that at present obtaining upon the outcrop companies.

Centrifugal Pumps.

To the Editor:—Although received some months ago, I have not until the present time found an opportunity to examine Bulletin No. 9, issued by the California State Mining Bureau, entitled "Mine Drainage, Pumps, Etc."

In this work I find no less than five drawings of mine, reproduced from a paper published in London nine years ago, without either credit to myself or to the Institution of Mechanical Engineers in England, by whom the paper was printed.

Since that time great advances have been made in the construction of centrifugal pumps, and had the author applied to me—as he seems to have done to others—for practical information in various kinds of pumping apparatus, he could have embodied in his work something on centrifugal pumping more useful than appears.

It is well known on this coast and elsewhere that I have for fourteen years past been directly engaged in practically making and designing centrifugal pumps, and have at this time successfully operating more that 10,000 H. P. of such pumps.

I am not, however, complaining on the score of the professional ethics involved so much as of palpable misrepresentation.

On page 153 of the work referred to is a drawing marked "Richards Centrifugal Pump," thereby intimating that I am the inventor or designer of a particular type of such pumps, when the author must know, as is explained in the paper from which the drawing was taken, that it represents only an example of practice. But this is not the main point. On page 159 of the bulletin there are the following words:

"In the Richards single inlet pump the disc is perforated at 'N, Fig. 164,' *to allow the pressure on both sides to equalize to a certain extent.*"

The italics I have added.

Whether such a statement is made by design or in ignorance of the operating conditions I am not able to say, but it will be obvious to any one at all acquainted with pumps of this kind that the perforations referred to have nothing whatever to do with balancing the impeller disc; also, as is plainly explained in the text of the paper from which the drawing was taken, the pump impeller is "absolutely balanced."

Now that the subject is under discussion, I will call attention to the methods of construction for centrifugal pumps recommended by the author on pages 155 and 156 and elsewhere in his work.

The types shown are old and obsolete, and in their nature not adapted for use in mines where the head to be operated against is usually more than in other cases. The designs shown on pages 155 and 159 are not centrifugal pumps at all, but belong to a class known as impelling pumps, operating mainly by tangential energy and never adopted in good practice for heads exceeding 8 feet, and even for such cases will have an efficiency below that of pumps of the same class made here a dozen years ago.

On page 156 is shown a modification adopted and abandoned by at least two well-known firms on this coast and out of use for five years past.

I will also call attention to the mathematical formulæ introduced, and affecting only the velocity of rotation, a thing of little or no concern in centrifugal pump practice, and especially as it is set forth in connection with a pump in which the internal flow changes *as 12 to 5 while it passes through the impeller.*

I offer no criticism of the author's work in other branches of pumping machinery. His well-known ability is a sufficient warrant of its correctness and value, but his experience in centrifugal pumping, so far as I know, is confined to one small pump, made about two years ago, that has not reached a "second edition" in that time. Very respectfully,

San Francisco, Dec. 5th, 1896. J. Richards.

Glossary of Mining Terms.

(Concluded from L. W. Tatum's Compilation.)

Quarry—Any open work in rock on a plan of excavating the entire mass, as distinguished from working a seam or vein by shafts or approaches under cover.

Quartz—Silica. A constituent of granite. The free gold of California being found in quartz, the word was applied to the gangue of such lodes and so to other forms of vein matter, until it is now used vaguely to mean the ore, the float, the gangue, or that part of the gangue which indicates the pay streak. In the act of Congress it is used with the word rock (quartz or other rock) in the sense of pay rock.

Quartzite—A metamorphosed sandstone. A rock containing usually about 98 per cent silica, with a small percentage of foreign materials, principally iron.

Quartz Mining—Any hard gold or silver ore as distinguished from gravel or earth.

Quicksilver—Mercury, used in sluices to catch gold, also in pans and on copper plates to catch free gold and silver in milling.

Quick—(Adjective) Soft, running ground; an ore or pay streak is said to be quickening when the associated minerals indicate richer mineral ahead; also an abbreviation for quicksilver.

Rafter Timbering—That form of mine timbering in which the timbers appear like roof rafters.

Raise—A shaft or winze which has been worked from below.

Range—A mineral bearing belt of rocks.

Reacher—A slim prop reaching from one wall to the other.

Reamer—An enlarging tool.

Reef—The outcrop of a hard vein projecting above the surface; also applied to auriferous quartz lodes.

Regulator—A sliding door to apportion the amount of air to be admitted into a section of the mine.

Refining—The purification of crude metallic products.

Refractory—Resisting the action of heat and chemical reagents.

Reserves—Mineral standing in mines between shafts and levels that will pay to extract.

Retort—Amalgam after distillation; gold and silver combined with other metals.

Rhyolite—A name common to igneous rocks of wavy texture indicative of movement or flowing when in a fluid state.

Rib—A pillar of vein matter left to support roof or wall.

Riffles—Cross-blocks in a sluice box to catch the gold.

Rob—To gut a mine; to work for the ore in sight without regarding the supports, reserves or any future considerations.

Robbing—The taking of mineral from pillars.

Roof—The stratum or rock overlying a deposit, or flat vein. The top of a stope, adit, drift, or any horizontal working.

Rocker—A small trough, with an oscillating motion, used in placer mining.

Room—A working place in a flat mine; corresponds to stope in a steep vein.

Royalty—Percentage paid by lessees on the ore extracted.

Rusty—Oxidized. Metal coated with oxide. Applies to gold or silver which will not easily amalgamate.

Saddle—The ridge of a stratum or ore-bed.

Safety Cage—One supplied with safety appliances.

Safety Lamp—A lamp in which the flame is protected from immediate contact with the surrounding atmosphere.

Salting—Placing foreign ore in the crevices of a vein or elsewhere to fraudulently raise its apparent value.

Sample Works—Works for sampling and determining the values obtained in ores; where ores are bought and sold.

Samson Post—An upright supporting the working beam which communicates oscillatory motion to pump or drill rod.

Scale—The incrustation deposited in boilers from evaporated waters. A loosened fragment of rock threatening to break off and fall.

Schist—Crystalline or metamorphic rock with slaty structure; usually carrying mica, sometimes argillaceous.

Schistose—Granitic rock having a slaty structure, admitting of division into slabs.

Seam—A layer of mineral.

Seed Bag—A water-tight packing of flaxseed around the tube of a drill hole to prevent the influx into the hole of water from above.

Segregations—All those aggregations of ore having irregular form but definite limits. They differ from beds and lodes by the irregularity of their form; from impregnations by their definite limits.

Set—Portion of ground taken by a tributer; a frame of timber.

Selvage—Thin band of earthy matter between the walls and veins.

Shale—Fissile argillaceous rock. Generally soft.

Shaly—Brittle ground.

Sheave—A grooved wheel over which a rope is turned.

Shelly—Broken ground.

Shift—A miners' turn or spell of work. Two shifts imply 16 to 20 hours work; three shifts imply 24 hours work.

Shoot—To break rock by means of explosives.

Shute—An inclined board-way through which ore is delivered.

Silica—Silex or Quartz.

Siliceous—Quartz-bearing.

Sill—A windlass frame; the floor piece of a timber set.

Silver—A metallic element; the whitest of metals; specific gravity, 10.53; fusing point, 1873 degrees; symbol Ag. atomic weight, 108.

Silver Glance—An ore; when pure contains 87 per cent silver and 13 per cent sulphur.

Skip—A bucket or box used to hoist material from a mine.

Slag—Waste from smelter furnaces.

Slickensides—Polished walls of a vein, caused by trituration.

Slide—Timbers in shafts, etc., to guide buckets and materials; the mass of loose rock overlying each lode or country; one kind of a fault; a vertical dislocation of the vein.

Slimes—The finest of the crushed ore and gangue from the mills.

Slope—An inclined opening to a mine. It is an inside slope when it does not extend to the surface.

Sluice—A series of boxes set in line and floored with riffle blocks to catch the gold in placer mining.

Smelting—The reduction of metals from their ores in furnaces. It is a form of the word melt. In smelting the ore is melted. In other processes it is roasted.

Smift—A slow burning fuse.

Sole—The floor of a horizontal working.

Sollar—Any platform or wooden floor or covering in a working.

Spar—A general term applied to rock with distinct cleavage and luster; usually applied to the different lime formations.

Spilling—Timbering used in quicksand or loose ground where laths are driven behind timbers and kept flush with the heading.

Spilling—A process of timbering through soft ground.

Spit—To light a fuse.

Spoon—A slender iron rod with a cup-shaped projection at right angles to the rod, used in scraping drillings out of a bore hole.

Spreader—Timber stretched across a shaft or stope.

Spur—A branch of a vein.

Square Sets—A kind of timbering used in large spaces.

Squeeze—The closing of a room by the setting of the roof or the rising of the floor. The thinning away of a seam.

Squib—A slow fuse used for igniting an explosive.

Stamps—Weights for crushing ores.

Stamp Mill—A mill for crushing ores by means of stamps.

Station—Stopping places in shafts; places cut out for pumps, etc.

Stockwerke—A mass of country rock so impregnated by a congeries of veins as that the whole must be mined together.

Stope—The part of a vein above or below the drift, from which the ore has been removed.

Stoping—The act of breaking the ore above or below a level. When done from the back of a drift it is called overhand or back stoping; when from the sole it is underhand stoping.

Stoping Ground—The ore blocked out ready to remove.

Stowing—The debris of a vein thrown back of a miner to support the roof or hanging wall of an excavation.

Strata—A series of beds of rocks.

Stratified—Showing more or less distinct and separate layers or strata.

Stratum—A bed of rock or earth of any kind.

Streak—The color of a mineral when scratched.

Streak Powder—The powder obtained by filing a piece of mineral.

Strike—The extension of a lode or deposit on a horizontal line. Synonymous with trend and course. The discovery of pay ore.

Stringer—The same as Feeder.

Stripping—Uncovering an ore body on the surface.

Stulls—Framework to support the rubbish when stoping.

Stull Dirt or Stull Rock—Material supported upon the stulls.

Sublimation—The theory that the vein matter was introduced in a gaseous condition.

Sulphide—The chemical union of sulphur with a metal.

Sulphuret—A sulphide. Sulphide is the more recent and approved term. Synonymous with Pyrites.

Sulphurous—The odor of burning sulphur.

Sump—That part of the shaft below the platform to collect water.

Swamp Ore—Bog iron is sometimes called swamp ore, when found in low, wet ground.

Swab—The stick used to clean out blast holes.

Synclinal—The trough formed by the downward inclination of the strata from each side. The anticlinal being the ridge formed when the strata dips in opposite directions.

Syndicate—An association or council of persons; in use since the war to designate any combination formed to carry out a large financial enterprise.

Tackle—The windlass, rope and bucket.

Tailings—The refuse left after washing ores containing metals not saved in the first treatment.

Tamp—To hammer loose earth into a blast hole.

Tellurium—A silver white, brittle substance, generally classed among metals; usually combined with gold, silver, lead and copper. Sp. gr. 6.65; At. wt. 128. Symbol Te.

Tempering—The act of reheating and properly cooling a bar of metal to any desired degree of elasticity or hardness.

Throw—The amount of dislocation of a vein.

Ton—In metalliferous mines of the United States, 2000 lbs.

Tram—The pair of parallel lines of rails of a trackway.

Trammer—One who pushes cars along the track.

Trap—A door used for cutting off a ventilating current, which is occasionally opened for haulage or passage; guarded by a trapper. Any volcanic rock.

Trend—Dip or course of a vein from the perpendicular.

Tribute—A system of contract mining by which the miner receives his pay out of the gross value of the ore sold, less a certain deduction for royalty to the mine owner.

Tributers—Miners who work at a set, or piece of ground, taking the proceeds as wages, after royalty is deducted, but who work under the direction of the owners and hold no possession or title as lessees.

Triturate—To grind or pulverize.

Trouble—A fault.

Tufa—Any open porous rock.

Tut Work—Work paid for by the foot as distinguished from tribute work.

Unctuous—Having a greasy feeling like soapstone.

Underhand Work—Picking or drilling downward.

Underlie—The angle of a vein from the perpendicular.

Upcast—A ventilating shaft where the air ascends.

Upraise—A shaft or winze excavated upward.

Upthrow—An upward displacement of the side of a fault.

Valve Bucket—A bucket with a valve in the bottom for hoisting water.

Vein—Same as ledge.

Veins—Aggregation of mineral matter in fissures of rocks. The word vein has a broader scope than the word lode, including non-metallic beds. It is also applied, in working, to smaller seams threading the greater deposits.

Veinstone—The mineral in a vein which holds the ore.

Vena—A small vein or the branches of the veta, or main vein.

Veta—A main vein. (Spanish.)

Vitreous—The luster of broken glass.

Vug—A cavity in the ore or rock.

Wall—The plane of the country where it touches the side of the vein, when used in reference to lodes. The side of a level or drift, when used with reference to the workings.

Wall Plate—The long horizontal stick in timbering which is parallel to the vein.

Waste—The debris of an excavation. Gob. Goaf.

Weathered—Changed by exposure to the weather.

Wedging—The material, moss or wood, used to render the shaft lining tight.

Wheal—A pit or hole in the ground. A mine. The names of most mines in Cornwall are preceded by the word Wheal. Old form Huel. (Cornish.)

Whim—A machine for raising the bucket by means of a revolving drum.

Whip—An apparatus for raising the bucket with rope and pulleys, by horse power on a straight drive.

Whin—The Scotch name for hornstone.

White Damp—The noxious gas called carbonic-oxide gas.

Winch or Windlass—A hoisting machine consisting of a horizontal drum operated by crank-arm and manual labor.

Winning—Recovering ore left in a mine, or mining.

Workings—Any underground development from which ore is being extracted.

Winze—A shaft sunk from a level, not necessarily connecting two levels.

Zinc Blende—A combination of zinc and sulphur, often accompanied by other metals.

Zone—Used to specify a certain geological position of a strata or layer of rock.

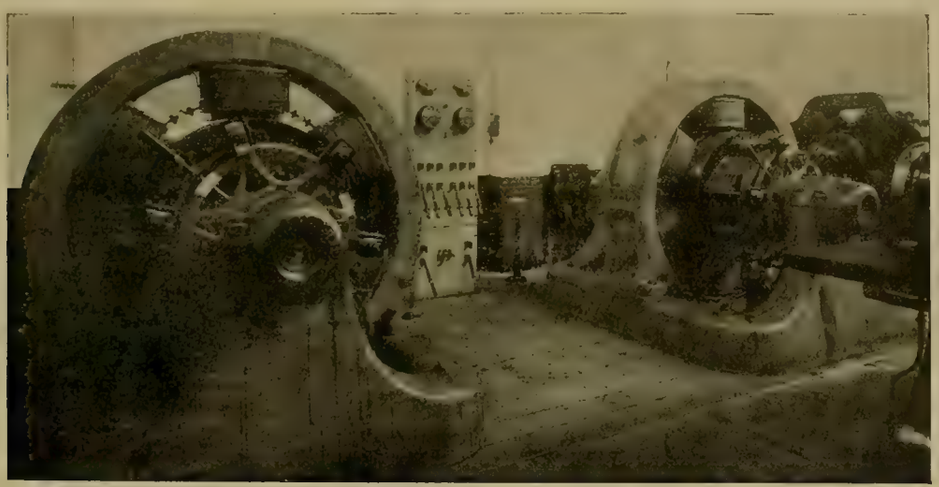
Electrical Progress.

Niagara in Harness.

November 16, 1896, marks an epoch in electrical history. One minute after midnight, with the closing of five sets of switches, the power from the cataract at Niagara was brought into the city of Buffalo.

The history of the generating station of the Niagara Falls Power Company is already so well known to our readers that we will not refer to it, except to say that the three great two-phase generators are all in use, furnishing power to the factories in and immediately around Niagara. The most recent addition to the power-house equipment is one of the General Electric Company's converters to take the two-phase current from the generators at 2200 volts and turn direct current into the lines of two or three railroad companies at a pressure of from 575 volts to 600 volts.

When the question of the transmission of power from Niagara to Buffalo was under discussion, the merits of the three-phase system as compared with the two-phase system for transmission purposes were canvassed. It was shown to the satisfaction of the Power Company that, in using the three-phase system for transmission, a large economy could be made in the transmission installation, and the three-phase system of the General Electric Company was selected.



THE ROTARY CONVERTERS AT BUFFALO.

The current from the falls is generated by the Niagara Falls Power Company, which transmits the power as far as the city limits of Buffalo. All the construction work in connection with this installation was effected by the Cataract Construction Company, while the distribution, after it has reached the city limits, is in the hands of a subcompany entitled "The Cataract Power & Conduit Co."

The two-phase current starting from the generators in the power house is led first to the switchboard and then in lead-covered cables through the covered "Bridge of Sighs," which passes over the canal of the Niagara Falls Power Company to a spacious transformer house, which has been erected on the opposite side of the canal. Here the cables are connected to four switches and pass to the step-up transformers, the largest in the world, erected on a platform at one end of the power house and placed over an air-tight chamber. Each has a capacity of 935-K. W. or 1250-H. P., and stands 94 inches high on a base 64x56 inches, and weighs 25,000 pounds.

The problem of cooling these transformers has been solved by driving a blast of cold air up through the air passages provided in the core and coils. The blast is furnished by a large blower driven by a 5-H. P. multipolar motor, which is bolted to it. It is in these transformers that the two-phase system is abandoned, and the current given three phases and raised from 2200 volts alternating to 11,000 volts. Provision is also made in these transformers for raising the voltage to 22,000 volts as soon as higher pressure shall have become necessary.

From the transformers three cables pass to the high-tension switchboard standing beside them. This switchboard is also of marble and carries three high-tension switches, each switch being separated by a marble barrier about 1 inch thick. This partition prevents arcing from switch to switch at the high pressure used. The switchboard also carries current indicators and three special fuse carriers. From the transformer house the wires pass through lightning arresters to the first pole of the pole line standing immediately in the rear of the building.

The pole line erected by White, Crosby & Co. runs along one side of a special right of way 30 feet wide. The number of poles in this line is about 21,000; they range from 35 to 65 feet in length and are set about 75 feet apart. Each pole is provided with two 12-feet cross-arms for the transmission line and one small cross-arm for a telephone line. Each side of each cross-beam has space for three pins to carry three insulators, provision being thus made for four circuits of three wires apiece, the capacity of each circuit being 5000 H. P. at 11,000 volts pressure and 10,000 H. P. at 22,000 volts pressure. On the outside of each upper cross-arm is a small iron pin, 18 inches high, which serves to carry a galvanized barbed wire, used as a lightning conductor and connected to the ground at the foot of every fifth pole.

The insulators used are of the double-petticoat pattern. Each weighs about twelve pounds and is provided with two annular grooves in the bottom, which effectually prevent any moisture getting to the central pin on which the insulator is placed. The outside of the insulator is provided with a gutter running to a point on each side to carry off the water. These insulators were subjected to a rigid test of 40,000 volts alternating, to determine the electrical resistance, and not until they had withstood this pressure satisfactorily were they accepted.

The length of the line is twenty-six miles. The overhead conductors are of bare, stranded copper, each conductor having a diameter of 350,000 circular mils, and each lies in a groove at the apex of the insulators. When this line approaches the station at Buffalo, which it does along the banks of the Erie canal, it is charged from overhead to underground, the wires passing from the last pole into a small brick terminal house. In this house connections are made with the underground cables through lightning arresters. The underground cable is rubber-covered and sheated with lead, and is of the same diameter as the overhead conductor. It is laid in a subway consisting of vitrified tile ducts, each duct having a hole 3 inches in diameter. The subway consists of twelve of these ducts, laid 18 inches below the surface of the ground, and surrounded on all sides by 4 inches of concrete. Three ducts only are in present use. The insulation of these cables was tested to withstand 80,000 volts.

The subway terminates in a small brick structure erected in the rear of the Niagara street power house of the Buffalo Railway Company. This contains the step-down transformers. On entering this small house, the wires are connected to another switchboard, carrying high-voltage switches and fuse carriers separated by partitions of marble in the same manner as on the high-tension switchboard at the Niagara Falls end of the transmission. From this board cables are carried through lightning arresters to the transformers, of which there are three, two being in use and the third being held in reserve. Each weighs 7000 pounds, is 82 inches high with a base measurement of 47x36 inches. In the step-down transformers the pressure is reduced from 10,700 volts to 370.

A system of coiling the transformers similar to that used with the step-up transformers at the Niagara end is used.

From the step-down transformers the three-phase current, divided into two circuits, passes over six cables to the main floor of the power house of the Buffalo Railway Company, where they are connected to another switchboard. Thence they pass to the two rotary converters, each of 500 H. P. capacity. These converters are six-pole machines and in their operation the three-phase alternating current at 370 volts is changed into direct current at 500 volts, suitable for delivery to the feeder line of the electric street railway. Each converter armature is provided with three collector rings at one side and a comutator at the other, and may be started either by the alternating current or by direct current from the railway lines. The converters may be used in parallel with the other generators, or the current can be thrown directly into the feeders of the railway system.

The lightning arresters of the Wirt type have been especially designed for heavy voltage transmission work and are single-pole. They consist of strips of marble, upon which are mounted eleven cylinders, giving one air-gap space $\frac{1}{32}$-inch for each 1000 volts, with an allowance of 25% rise in the potential. In the action of the arrester, the large metal cylinders serve to chill the arc, so that, on reversal of the current, the arc is extinguished, no dependence being placed upon any non-arcing property of the metal to put out the arc. In order to limit the current on short circuit, and thus the heating effect, a special solid graphite rod of low non-inductive resistance is used. The arresters are similar to those used on the Big Cottonwood transmission at Salt Lake City, which have effectually protected the machinery in many severe storms, and are now being used extensively in transmissions where high voltages are employed.

The entire apparatus used in the transmission of the current from Niagara Falls to Buffalo is from the shops of the General Electric Company, having been designed especially for this special service.

Scientific Progress.

Aluminum Cooking Utensils.

At a recent meeting of the Congress of Applied Chemistry Mr. Boroma spoke of aluminum as a material for cooking utensils as follows: "The utility of an aluminum dish, in respect to its fitness for culinary vessels, depends on the purity of the metal. A pure aluminum dish is almost, if not quite, as resistant to solvent effects of ordinary foods as any common metal. The impurities which do the most harm are sodium and carbon. When the aluminum contains carbon an electric current is at once set up when a suitable liquid is applied. In such cases after water, especially if it be saline, has stood in the dish for one or two weeks, the surface will be found dotted with brilliant rings, and, on scraping off the aluminum, the particle of carbon will be disclosed. If a strong solution of salt be used, the action may be sufficient to cause a perforation of the metal. The aluminum of commerce, unfortunately, is not very pure, and it is for this reason that so many aluminum dishes have shown a rapid deterioration. The French troops in Madagascar have been supplied with fifteen thousand sets of aluminum dishes, and, when a soldier has to carry his kitchen with him, the importance of lightness is not to be despised. But, even granting that in cooking in aluminum dishes a small amount of alumina is introduced into the food, it has not been shown that it exercises the least harmful action on the digestion. The experience of two men may be cited who lived for a year on food prepared exclusively in aluminum dishes without the slightest impairment of their health."

Bricks from Slag.

The manufacture of brick from blast furnace slag by the Bohemian Mining Company at their Karl-Emil works has increased from 200.000 bricks in 1888 to 12,100,000 in 1895. In the Karl-Emil blast furnaces limonite of the Bohemian sub-silurian formation is being refined by means of coke, whereby slag is produced. This slag, mixed in granulated condition with caustic lime, hardens to a cement-like mass, from which the so-called slag brick is produced. Such a slag brick, weighing about 10 pounds, can theoretically bear a burden of 38 pounds per square centimeter, though practically no heavier burden than about 25 pounds is ever put upon it. Hence, 1000 bricks can be piled safely above each other without any danger that the lowest one may be crushed by the weight. The broad side of the brick can bear a burden of 10,000 pounds. The manufacture of slag brick is based upon the principle that from granulated slag and caustic lime a cement-like mixture may be produced. The slag is transformed to sand, the latter mixed with lime-water of a consistency corresponding to the addition of lime desired, and the mixture formed into bricks and pressed.

THE idea that droughts occur in regular cycles of nineteen years has been advanced by H. C. Russell in a paper to the Royal Society of New South Wales. He finds historical evidence of three kinds of drought—the first lasting from three to seven years, the second more intense and relatively shorter, and a third that seems to rank between the other two and is more irregular. The different kinds occur on different years, but with the same interval. Since the year 900, with fifty-two recurrences of the nineteen-year period, the records show 78 droughts of the first kind in various countries, all of them fitting into this cycle, and filling 44 of the dates; while of the total of 208 recorded droughts for the same

time 193 fit into the cycle. Of 20 droughts before the Christian era, all but one fit in. There is evidence, moreover, that the nineteen-year weather cycle was known to the Jews, the Egyptians, and other ancient peoples. The existence of the cycle is confirmed by falls of red dust. Red dust is obviously proof of drought somewhere, and of the 69 recorded falls—the first in 738 B. C.—all fit into the cycle. For this weather periodicity Mr. Russell finds but one possible prime motor, the moon, thus settling to his satisfaction the question of lunar influence. It appears that when the eclipses congregate about the equinoxes—that is, in March and September—they do so in the years that give us great droughts; that when they accumulate in February and March and in August and September we have the more intense and shorter droughts of the second series; and when they accumulate about March and April and September and October we have droughts of the third class.

Mechanical Progress.

Fire-Proof Construction.

Practical and efficacious methods of fire-proof construction have been perfected only in recent years. Previous to 1890 the subject of "fire-proofing" had received little scientific study, and the practical work was largely in the hands of ignorant workmen. As a consequence, very few of the so-called fire-proof buildings erected before that time are actually fire-proof. While suitable materials have in many cases been employed in these buildings, they have not been intelligently adapted or suitably disposed. Insignificant fires in such buildings have resulted most disastrously, and in some instances have utterly wrecked the buildings. Careful investigation of the physical properties of structural iron and steel when subjected to heat, and close observation of the effect of fire and water on different materials, have within a comparatively short time developed efficient and economical methods of "fire-proofing."

The constant and increasing demand for fire-proof buildings has resulted in the development of forty-seven different systems of fire-proof construction, designed to serve the purpose of the clay products, at a reduced cost. Some of these, based upon correct mechanical principals and contemplating the use of none but suitable materials, are unquestionably fire-proof in the broad sense in which the term is now used, and deserve to be recognized and ranked according to their merits. Tests of the systems have in some cases been made, but generally by interested parties, under different conditions, and with the details of the construction not quite as they would be in practice. The lack of exact knowledge respecting the various systems, and the desire to ascertain the relative efficiency and fire-proof qualities of each, have actuated the department of buildings of New York City to conduct a series of careful and exhaustive tests. Each system is subjected to a severe fire and water test under identical conditions. For this purpose suitable structures are erected, according to plans furnished by the department of buildings, by each party desiring to make a test. Engineering Magazine.

Advance in Engine Indicators.

Several years ago an expert steam engineer was called on to prescribe a remedy for an engine that was not working smoothly, and was not as efficient as could be desired. He was asked what he would charge per day for indicating it and adjusting the valves, to which he replied, "Fifty dollars."

The owner of the engine wished to get everything done by the day as far as possible, in order to avoid paying unfair profits which he considered to be the rule where contract work prevailed, but this was a profit that he had not calculated on, so he promptly declined to pay it, in an emphatic manner. "Very well," responded the expert. "I will make you a proposition: I will indicate the engine, set the valves, and you shall pay me one-half of the value of the coal saved in six months, and I will accept your statement of the amount." As there was no possible chance for loss on such a basis it was readily agreed to, the job done, and at the end of the stipulated time the expert was paid more than six times the amount called for by his first proposition. But as the owner had saved a like amount during the same time there was no cause for dissatisfaction.

Such cases were always rare, but they are more so now than ever, because more indicators are manufactured, and the natural consequence is that engineers are familiar with them to an extent that was not thought possible a few years ago. Much credit for this desirable state of affairs is due to the societies of engineers that under various names are to be found in nearly every State in the Union, and which are doing a great work in educating their members.

The price of good instruments which answer every purpose for valve setting is so low that they are within reach of a majority of the craft, and even the most expensive kinds are now sold at reasonable prices. The result is that we find indicators in the hands of men who know little or nothing about them, but who are ready to learn their use and how to avoid their abuse.—Scientific Machinist.

Testing Cast Iron Car Wheels.

At the Altoona shops of the Pennsylvania Railroad a method of testing car wheels has been in vogue for some time which is creating a good deal of discussion. A sand mold is made around the tread of the wheel, which leaves a space of about 2 inches wide between the sand and the tread. Melted iron is then poured into this space. Engineers report that most of the wheels tested in this way broke or cracked in from 25 seconds to 1½ minutes from the time the metal was poured.

Many claim that the thermal test is not a practically fair one and is calculated to unduly alarm the traveling public. Nevertheless, the Pennsylvania Railroad officials at Altoona have been developing the test, and have reached the conclusion that in specifications for wheels which they buy a certain number in each lot received shall be subjected to a test of this kind, and if they do not stand it all are to be condemned.

It was ascertained that wheels which had been in service, or second hand wheels, did not stand the test as well as new ones. It is proposed hereafter to take three wheels from every 100, and subject one to a drop test and two to the thermal test.

THE following inexpensive method of testing steam gauges without the use of scientific instruments has been suggested by the *Scientific Machinist:* If you can erect a pipe of any size alongside of your stack or chimney, or at any other convenient place, it will answer for low pressure, for when filled with water, and the gauge attached, it will indicate a pressure that may be determined by multiplying the height of your column of water in feet by .434, provided the spring is accurate. If this is impracticable, you may obtain a brass tube whose area is 1 square inch, and fit a piston into it. Fill the tube about one-half full of water and fasten it in a vertical position. Put the piston into the tube and, having previously connected your gauge to the bottom of the tube, place a given number of pounds avoirdupois on the piston. The gauge should indicate a pressure equal to the weight applied. There will be some friction of the piston in the tube, but this may be practically overcome by revolving the weights by hand. To determine the diameter of this tube, divide the required area in square inches by .7854 and extract the square root of the quotient: $1 \div .7854 = 1.273$ and $\sqrt{1.273} = 1.127''$ diameter.

Practical Information.

The World's Oil Supply.

The market for petroleum and other crude oils is ever widening; it requires but a slight reduction in price to extend the use of oil fuel in ships and for other mechanical purposes, while the extreme simplicity of the oil motor has in recent years greatly extended its application; and now we are threatened with the oil motor car, which may or may not absorb an appreciable amount of the world's oil supply, says London *Engineering*. The United States and Russia are our great sources of supply; the former last year produced 53,000,000 barrels of forty-two gallons, and the latter 38,333,000 barrels, and carefully compiled statistics fail to account for more than 95,000,000 barrels as the world's production, but there is no doubt that much oil found is used locally, and therefore not accounted for.

That the supply is scarcely equal to the demand is in some measure indicated by the continued high level of rates. The output in the United States, especially in Ohio, Indiana and California, shows a great increase. Only once, in 1891, has the total been greater than that of 1895, already given, and withal stocks have greatly decreased. In the great Appalachian oil field, producing 31,000,000 out of the 53,000,000, the stocks only include 5,333,000 barrels. Thus prices have increased. Indeed, the average is higher than in any year since 1877, and the lowest rate last year was above the highest reached in 1894.

As to the prospects of increased supply, some interesting points are brought out in a recent report made to the Geological Department by Joseph D. Weeks: Between twenty and twenty-five promising wells have been sunk in the Appalachian field, two yielding about 6000 gallons per day. In the Los Angeles district of southern California there has been great extension, the total having trebled in three years. In Wyoming also there is increased activity, but the difficulty is the absence of cheap transportation.

It is, however, from Peru that the greatest augmentation of supply may be anticipated. The principal field is in the department of Piura, and estimates have been made as to the area yielding petroleum, one of them putting it as high as 7200 square miles. Since the Pennsylvania field is only 350 square miles and in thirty years has given forth 516,000,000 barrels, the prospects from Piura seem bright. Energy, it is said, is alone required. Of forty-nine wells bored since 1892, forty-four have been productive, and some of them yield 30,000 gallons per day. A London company has been working some of the wells, and the imports of oil have decreased to one-third the volume of 1889, the price of the local oil being one-third that of North American petroleum. Crude oil, too, is being used on the locomotives on all the Peruvian railways, in several manufacturing establishments, and in the gas works.

In Russia 269 new wells were drilled last year, 133 being deep wells, the average depth of all being 540 feet, and in six years 1371 wells have been drilled. The average number in operation now is 622, producing 38,000,000 barrels, of which 26,000,000 are pumped, the remainder flowing freely. The total output has been steadily increasing. In 1889 there were 278 wells, yielding 20,000,000 barrels; now 622 wells yield 38,333,000.

WHAT can be claimed to be the largest and fastest locomotives in the world are two which have been received by the Denver and Rio Grande Railway. They weigh seventy-four tons each without tender, and are said to be able to travel at a speed of seventy miles an hour, and have hauled trains of forty-five loaded freight cars in Colorado without effort. They will go into service on passenger trains and will be run entirely on the fast overland train service between Denver and Pueblo. These two locomotives are the heaviest in use for mountain traffic, and are what are called ten-wheeled passenger locomotives. Their dimensions are as follows: Boiler 64 inches diameter at smallest ring; firebox, 10 feet long by 3 feet 6 inches wide inside; number of flues, 274, 2¼ inches in diameter, 13 feet 4 inches long; working steam pressure, 200 pounds; cylinders, single expansion, 20 inches diameter, 26-inch stroke, with extension piston-rods; driving-wheels, 63 inches diameter over tires; truck wheels, steel-tired, 33 inches diameter; weight of engine on drivers, 118,000 pounds; weight on truck, 30,000 pounds; total weight in working condition, 148,000 pounds.

Proposed Canal.

Joseph R. Encke, Trenton, N. J., has been making a study of canals for thirty years and now proposes a great inland canal. He proposes that the Government build the canal by issuing non-interest-bearing bonds. The canal at the water line is to be 330 feet wide, 50 feet deep in the middle, 40 feet on the sides, and concave in shape, so that perfect docking can be secured on both sides of the dock. There are to be double locks, so that steamships going in opposite directions can pass through. There will be enough water to let any battleship or steamship go through at the same speed that it goes on the ocean. There is to be a railroad running parallel with the canal on one side, and the other side is to be devoted to industries. Dr. Encke, in an interview, said: "It will cost considerable money to build such a canal, but the revenues will be enormous. The Sultan of Turkey has secured a return of nine billions of dollars, and the investment is sixty millions, which was the cost of the Suez canal. The canal is to be lined with a double-faced wall, sides and bottom, on a concrete foundation, so that it will endure for 10,000 years. There will be enough water to insure speed. The rodents cannot harm such a wall. The building of this canal would furnish employment to many idle men. It would cut down the loss by storm on the ocean. It would give an inland route in times of war." The route would be from Sandy Hook bay across New Jersey into Delaware bay, then across the State of Delaware to the Mississippi valley, and up to the Great Lakes.

Progress in Japan.

At the last session of the Japanese diet the following sums were voted for industrial development: (1) Improvement of the existing government railways, 26,553,000 yen, the payment to be extended over six years. (2) Extension of the telephone system, 12,802,106 yen, the payment to be extended over seven years. (3) Construction of a railway in Hokkaido, 1,178,313 yen, the payment to be extended over two years. (4) Construction of an iron foundry, 4,095,793 yen, the payment to be extended over four years. (5) New marine telegraph cables, 536,877 yen, the payment to be extended over two years. (6) Purchase of arms and ammunition, 9,258,088 yen, the payment to be extended over six years. (7) Manufacture of arms for the army, 6,486,766 yen, the payment to be extended over four years. (8) Manufacture of arms for the navy, 33,751,062 yen, the payment to be extended over six years. (9) Construction of ships for the navy, 47,154,576 yen, the payment to be extended over seven years.

The last three items were pronounced altogether insufficient by leading statesmen and the press.

THE Supreme Court of Connecticut has recently handed down a decision of interest to bicycle riders. The court holds that the rider of a bicycle has not an absolute right to pass on the right hand side in meeting a vehicle which is turning toward that side to the curb of the street, nor can be assume that the driver must turn out for him, but is bound to exercise the same degree of care which the law requires of the driver of the vehicle to avoid a collision.

Recent Additions to the Museum of the California State Mining Bureau.

Gold quartz, very rich in free gold, Schwartz Kopjes, near Barberton, South African Republic; gold quartz, Sheba mine, near Barberton, S. A. R.; auriferous conglomerate, Ferreira and City and Suburban mines, Johannesburg, S. A. R.; all from A. E. Roberts, E. M.

Three large and very handsome slabs of polished travertine, from the California Travertine Co. of Bridgeport, Mono Co., Cal.

Curious triple geode of ferruginous sandstone from Texas.

Sylvanite telluride of gold, raw and roasted, the latter showing abundance of gold, Cripple Creek, Col.: R. M. Marshall.

Gold quartz, rich in free gold, from the McHaney or Desert Queen mine, in the Colorado desert, Cal.: W. M. Macmillan.

Auriferous vein matter, with cinnabar and accompanying minerals, orpiment, sulphur, etc., Sunshine mine, Mercur, Utah; Victor Heikes.

Rich gold quartz, with abundant free gold; St. Elmo mine, Randsburg district; D. M. Pyle, Cal.

Rich copper ore, Bullion mine, Manvel, San Bernardino Co.: J. W. Hixson.

Argentite (fine specimen), Mollie Gibson mine, Aspen, Col.: L. H. Pike.

Rich quicksilver ore, Rosebush mine, Savona's Ferry, B. C.; and gold, silver and copper ores from B. C.: J. A. Veatch.

Kraenkite and schwartzenbergite from Chuquicamata, Chile: C. von Reisebach.

Pilinite, large sheet of this peculiar mineral, New Almaden mine, Cal.: C. C. Derby.

Gold quartz from the Ford, Gwinn, Rose Kimberley, Everett, Golden Queen, Fair View, Louisiana, Drummond, Pride of the West, Junction and other California mines.

Auriferous pyrite and pyrrhotite, Le Roi mine, Trail Creek, B. C., and a number of gold and silver ores from the Colville reservation, Washington; L. E. Richardson.

Indian implements, rock specimens and various ores and minerals, etc.

HENRY S. DURDEN, Curator.

Recent California Mining Incorporations.

California Gold Mining Company, Benton Mono County: D. C. Albright, Mammoth; O. H. Hill, F. K. Andrews, Bishop; N. Thompson, Benton; G. P. Doyle, Chicago: capital stock, $100,000: subscribed, $500.

Oleta G. M. and P. Co., San Francisco: W. E. Holbrook, J. B. Goldstone, San Francisco; H. Routledge, Oleta: I. N. Chapman, A. Bannister, Alameda: capital stock, $2,000,000: subscribed, $2,500.

Willmore G. M. Co., San Francisco: J. B. Marvin, F. J. Castlehun, G. A. Bouteiller, J. Bazzini: capital stock, $100,000: subscribed, $500.

Mother Lode Electric Power Company, San Francisco: J. C. Jens, A. Woodside, T. Frolich, G. Gall, W. J. Woodside: capital stock, $200,000.

American Mining and Exploration Company, San Francisco: W. Kolman, F. McCue, Lewiston; W. H. Harrison, E. W. McKinley, J. A. Webster, San Francisco: capital stock, $250,000: subscribed, $250.

The Old Bonanza Mining Company, San Francisco: D. R. Oliver, A. P. Johnson, S. C. Wilmans, Sonora; C. S. Benedict, F. W. Wilmans, San Francisco: capital stock, $1,200,000: subscribed, $500.

Bunker Hill Hydraulic Mining Company, San Francisco: A. J. Hughes, J. J. Jones, Happy Camp; J. O. Stephens, S. E. Thurston, W. H. Lee, San Francisco: capital stock, $1,000,000.

Sierra Buttes Con. G. M. Co., San Francisco: W. H. and R. Martin, Nevada City; P. Tantphaus, E. F. Leibrich, F. Boeckman, San Francisco: capital stock, $1,000,000.

'49 M. M. and P. Co., San Francisco: A. Christensen, J. A. Dineen, C. A. Bennett, C. Swain, E. A. Herman, G. Peterson, W. W. Watson: capital stock, $1,500,000: subscribed, $70.

Recently Declared Mining Dividends.

Swansea Mining Co., Utah, $5000; payable Dec. 10th.

Sacramento, Mercur, Utah, $5000; payable Dec. 10th.

South Swansea, Utah, $7500; payable Dec. 21st.

Last Chance, British Columbia, $20,000; payable Dec. 1st.

Le Roi Mining and Smelting Company, 5 cents a share, or $25,000, Dec. 4, making $250,000 paid in 13 months.

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Coast Industrial Notes.

—The hull of the new steamer Humboldt has been towed to this city from Eureka to have her machinery put in by the Fulton Iron Works.

—The largest brandy still in the world is at El Pinal, San Joaquin county, California. It makes enough brandy to keep 40,000 men continually drunk.

—The Secretary of the Treasury in his estimates asks for public buildings for the following cities the amounts named: Boise City, $130,270; Cheyenne, $186,969; Helena, $227,760; Portland, Or., $200,000; Pueblo, Col., $150,000; San Francisco, $100,000.

—The proposition to connect Santa Rosa with tidewater by an electric railroad is beginning to assume shape. N. W. Griswold states that the bonds have been placed in New York, and that as soon as the proceeds are received a contract for the construction of the road will be let.

—Nevada is not known as a cotton producing State, yet the Pioche *Record* says while the Bunkerville cotton crop this year will not exceed 20,000 pounds the product per acre is as good as usual, but the acreage was less. The cotton product of that settlement is ginned by water power and shipped to the woolen mills in Washington county, Utah, where it is exchanged for goods.

—The capital stock of the San Francisco Gas and Electric Company, which is the name under which the San Francisco Gas Light and the Edison Electric Light and Power companies have combined, will be $20,000,000, of which $13,816,000 will be issued as follows: To Gas Company stockholders, $10,000,000; to Edison Company stockholders, $2,750,000; to redeem bonds, $1,066,000. The balance of $6,184,000 will be held in the treasury.

Personal.

HENRY BRATNOBER is expected back from Colorado shortly.

ROBERT DUNCAN JR., superintendent of the Alaska-Treadwell properties is in the city.

C. J. JOHNSTON has gone to Johannesburg, South Africa, to take charge of some large mines.

JOHN F. KIPPER has been appointed superintendent of the Brunswick mine at Grass Valley.

ALFRED TREGIDGO of Grass Valley is about to leave for South Africa to take a position in one of the large mines there.

C. S. BATTERMAN has been appointed superintendent of the Boston & Montana Companys' properties in Butte, Montana. Mr. Batterman is a graduate of the College of Mines of the University of California.

BARCLAY BONTHORNE, W. GORDON ROSS AND THEODORE HADDEN arrived here from London last week, on their way to examine some mining properties in British Columbia. Mr. Bonthorne was commander of the Scottish corps at Johannesburg.

CAPTAIN THOMAS MEIN, the resident director of the Exploration Company of London, has returned from an examination of the company's extensive properties in Grant county, N. M., purchased for them two years ago by Louis Janin.

CHARLES BUTTERS, manager of the Rand Central Ore Reduction Company of South Africa, has arrived in New York on his way to California. Since his departure from California Mr. Butters has made a reputation as an authority in working ores, particularly in connection with the cyanide process, upon which his papers are of value.

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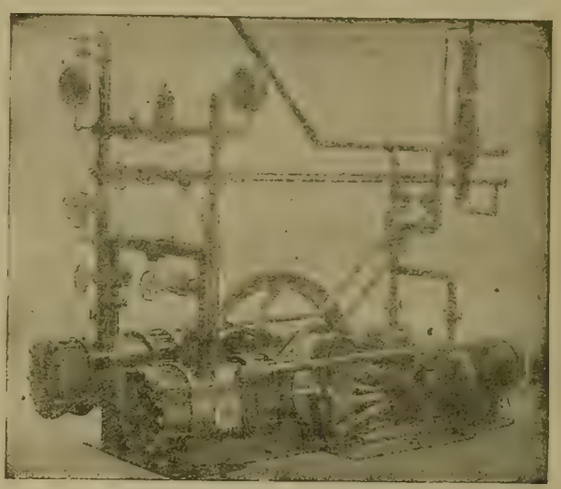

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Mining Summary.

CALIFORNIA.

Amador.

Dispatch: The 40-stamp mill at the Gwin mine has been started up. The shaft is down 1400 feet and drifts are being run from the 1200, 1300 and 1400-foot levels. From the 1300 and 1400-foot levels drifts will be run north and south at the same time. At present sinking below the 1400-foot level is being done in order to provide a proper sump for working the different levels.

At the Kennedy the new gallows frame for the hoist over the north shaft is nearing completion and will soon be ready for service.

The shaft at the Oneida mine is down over 600 feet. The new hoist has just been completed and housed in, and the machinery will be started up about the first of January. The engines are capable of hoisting seven tons 2000 feet in one minute. It is expected to go down 1800 feet before striking the ledge.

Record: A rich strike has been made in the Christianson gravel mine, above Volcano. The owner is purchasing machinery to crush the cement.

The Dane mine at Pine Grove is being thoroughly overhauled. The tunnel is being retimbered and a new 10-stamp mill erected by Smith Brothers.

The Acme mine, near McLaughlin Station, is again to be operated.

The porphyry deposit at the Robinson mine is about to be prospected by San Francisco men.

Republican: At the Anita, on the 500 level, the drifting has encountered ledge matter. The rock is of a peculiar character—porphyry, carrying a large percentage of good-looking sulphurets and some free gold. By hand mortar it gives a fair prospect in free gold. They have penetrated this formation 20 feet and drifted on it north and south. Considerable water is also encountered.

Rock is being hauled from the Argonaut to the Zeila mill for a test crushing.

Ledger: On the Gold Belt mine, recently discovered at Jackson, a shaft has been sunk and a crosscut run 30 feet passing through 18 feet of ledge matter.

Near Volcano work has been resumed at the Modoc, and all other mines are running full blast.

M. Christianson has struck rich pay gravel in what is known as the French claim.

Butte.

Mercury: J. B. Whitcomb, the receiver of the Spring Valley Gold Mining Company, is awaiting the redemption of the property recently purchased at foreclosure sale. It will cost the losers in the suit about $300,000 to redeem it. There are many men working on the company's claim at Cherokee Flat. They pay the receiver a royalty on the amount they take out and all do well apparently.

Register: Operations have been commenced upon the mine formerly owned by the Wiley Bros., which has always been believed to be rich, by an English company. Prof. Thomas Price is the agent for the company. Mr. Edwards is the superintendent in charge of the mine, and seven or eight men will be put to work upon it.

Calaveras.

Angels *Voice*: Sinclair and Betts, who held bonds on the Brunner and Romaggio mines, will put men at work in a couple of weeks sinking on both claims. The Brunner mine has a 30-foot ledge of $7 ore, and the shaft is down 160 feet with three crosscuts toward the east.

El Dorado.

Mountain Democrat: J. T. Smith has gone to Chicago to close the bargain for several mines near Greenwood, among which is the Golden Crown, a high-grade ore mine.

Smith and Shepherd will have a force of men at work on the White Elephant as soon as weather permits.

At the Baltic mine at Grizzly Flat the 5-stamp mill is running steadily on good ore. Their cleanup after a ten days' run yielded $2500.

Humboldt.

Blue Lake *Advocate*: The work on the Red Cap property has been discontinued for the winter. The ditch is constructed, while about 6500 feet of flume remain to be built yet. The flume is 3 feet deep and 6 feet wide, and when completed it will be 7200 feet long. It is understood that the suspension is only temporary. The company has located eight claims of twenty acres each. It is expected that early in the spring everything will be in readiness to begin mining.

Kern.

Californian: There has been organized a new mining district near the town of Majane called Majane. It takes the Jumbo mine for its center and includes the territory within 7½ miles in every direction. A stringent rule was adopted that every man filing a claim must commence work thereon within 60 days after recording. It is the absence of such a rule that has kept the Randsburg country back so long and prevented development. There are a number of rich mines already located in this district and considerable work has been done. From one mine 200 tons of ore has been shipped to the Selby Smelting Works and netted $15 a ton over all expenses.

Mariposa.

Miner: D. H. Oliver, of Stockton, is investing extensively in mining properties in the Moccasin creek district.

Goodall, Perkins & Co., of San Francisco, have resumed operations on the Baretta mine, at Hunters valley, on a new bond and expect to do extensive development work.

A number of men have been put on by the Merced Company during the past week. It is reported that the company intend doing a large amount of surface work in the near future.

The work of driving the tunnel on the Sunny Ridge mine was commenced last week.

Ballard and Martin, of the Rawhide, are trying their luck in Mariposa county on a mine upon which they have taken a bond; it is situated on Date's Flat.

Gazette: At the Rollins mine a tunnel is being driven by the parties who have it bonded. The tunnel is now in about 600 feet and will reach the main vein in a short time.

Nevada.

(Special Correspondence).—The lively foothill city of Nevada is rapidly becoming one of the most prosperous towns in the State. The streets, stores and hotel lobbies show a spirit of enterprise and enthusiasm rarely found, and nowhere except in prosperous mining sections. In the hotel corridors the uppermost topic is mines and mining. The town has a hundred guests looking for and experting on mining properties.

Within a radius of two miles there are 255 stamps dropping, and upon the regular pay day of one property alone—the Champion—the pay roll amounts to $15,000.

The contact vein here almost surrounds the city. As on the mother lode sections, so here, it has been found that mines are most valuable at great depth. The abandoned properties are again receiving attention, and deep mining is proving a success. Prospecting and the reopening of old mines are receiving attention in various sections of the county, both in and about Nevada City and in the outlying districts, particularly at Maybert.

The river banks on Deer creek, a mile below town, are studded with several plants that are a town in themselves—the Providence, the Cadmus and the Champion. The latter has eighty stamps in operation and forty are being added; preparations are under way to add forty in the spring. The Champion is down 1600 feet. This is one of the most perfect plants of its kind.

There is no drawback except perhaps the want of capital to open the idle properties. Local money is insufficient in quantity. Foreign capital, however, is finding its way hither. The people, particularly the rising generation, are alive to the situation. They encourage the idea of bonding properties at reasonable figures on long time to responsible people.

The following is a list of nearly all the properties in operation within two miles of town, and the number of stamps: The Gold Hill, 10 stamps, owned by Eastern people; the Mountaineer, 20, owned by San Jose people; the Providence, 40, owned by San Francisco people; the Pittsburgh, 10, owned by San Francisco people; the Mayflower, 20, owned by Nevada City people; the North Banner, 10, owned by San Francisco and Grass Valley people; the Federal Loan, 10, owned by San Francisco and local people; the California, 5, owned by A. D. Allen; the Stanford, 5, owned by Judge Caldwell; the Harmony, 10, gravel mine; the Delaware, 15, gravel mine; the Lone Star, 10; the Cadmus, 10, in course of construction; the Home, developing; the Champion, 80; the Spanish, 10, property of the Champion.

Development work is going on in every section. Hoisting works are being erected on extensive plans. Channel mining is receiving attention to a marked degree.

On the old Fortuna, one-half mile from town, a San Francisco company are doing development work on a large scale. They have a double-compartment vertical shaft down 400 feet, and are drifting on this level.

The Providence is down 1700 feet.

The Home is down 400 feet, and finds high-grade ore.

The Cadmus, a new property, has found high-grade ore. The mill is in course of construction.

The Kirkham, owned by San Francisco people, is down 270 feet.

The Champion is down 1600 feet.

The ore in this section, on the contact lode, runs from $6 to $60; forty-dollar ore is the average. Water power is available, and reasonable in price.

The great bonanza to Nevada county's mining interest is the recent completion of electric power works. The dam, flume and powerhouse are about six miles from Nevada City, on the Yuba river. The dam is 180 feet across the stream and 25 feet deep, of solid masonry and logs bolted to bedrock. The flume is three and one-half miles long and is capable of carrying 6000 inches of water. The construction of the flume alone cost over $50,000. The cities of Nevada and Grass Valley are both lighted from this plant. Two mines and two hoisting works take power from this plant. Two additional mines are preparing to run by electricity.

Nevada City, Dec. 8, '96.

The hoist in the Milliken Ranch gravel mine, owned by Poorman & Hastings, has been started up. A contract has been let to sink a double-compartment shaft, 5½x9, 500 feet. It is expected to sink 750 to 900 feet before striking the channel.

Transcript: A fine ledge has been uncovered in the Brunswick mine within the past few days. It is 18 inches wide, and was struck on the 900 level, 50 feet west of the shaft. The quartz is very rich, many of the pieces showing considerable free gold.

Fletcher, Kidder and others have bonded the Ellison gravel mine on Selby Hill. They are preparing to put up machinery above the Chaney ranch, near the Blue Tent road, and intend to run an incline into the hill.

At the California mine the tunnel which is to be 1800 feet long is now in 1200 feet and will tap the ledge at a depth of over 800 feet. The work is advancing now at the rate of 20 feet a week.

Transcript: A force of eight men are at work under Superintendent De Mott at the Blue Tent hydraulic mine, which is to be operated by drifting. No work has been done in this mine since the company was enjoined from hydraulicking fourteen years ago.

A rich strike was made at the Reward mine Saturday, when a good-sized ledge of fine quartz was encountered. The ore is heavily mineralized and shows considerable free gold. Indications are that an extensive pay chute has been struck.

It is reported that rich ore was struck in the Pittsburg mine last week.

The new incline shaft at the Delaware mine is now down over 500 feet, and the work of sinking is still going ahead. They are close to the main channel, and it will not be long before everything will be ready for breasting out and working the channel, which is known to be very rich.

Representatives of the syndicate of Sacramento men who recently bonded the Wright and Bailey claims, at Sweetland, have been making an examination of the property. The conditions of the bond are that a plant with a capacity for crushing 100 tons of ore per day shall be erected within six months; that the sum of $15,000 shall be paid for the claims within a year.

Placer.

Colfax *Sentinel*: A company has commenced work at Elmore Hill, in the claim owned by the California Powder Co. It is said that rich drift diggings were found there in early days, and it is thought there are some left.

The Horseshoe Bar Mining Company, under the management of Fred Roumage, has made extensive preparations to use the water carried by this flume to run hydraulic elevators. The immense flume being built by contractors is nearing completion. It is six miles long and has a carrying capacity of 1200 miners' inches of water.

Herald: At the Gold Blossom, owned by C. F. Reed of Auburn, about forty men are employed. At a depth of 300 feet the ledge is from 4 to 6 feet wide, and drift developments show that it is the largest as well as the richest body of ore ever opened up in the mine. The old Gold Blossom mill is not in running order and the ore is being milled at the new 10-stamp mill which Mr. Reed erected on the Eastern Gold Blossom about three years ago. Mr. Reed contemplates remodeling the old mill.

C. A. Reed is working a small force of men at the St. Lawrence. The upper tunnel is in about 700 feet on the ledge and opens up more than 300 feet of backs. The lower tunnel, which is about 50 feet deeper than the upper, is in 400 feet and shows a good-sized vein of high-grade ore.

At Ophir over 150 men are employed in the mines.

F. X. Lavallee has bonded the Green mine to E. W. Chapman, who has erected a hoist and has been engaged for some months in cleaning out and retimbering the old shaft, 300 feet deep.

C. C. Handy at Boulder has a force of six men. The 200-foot level, going west, is now in about 500 feet, with a strong ledge of good ore in sight. The 8-stamp mill on this property is kept going.

Five men are at work on the Morning Star mine.

The Hathaway shaft is now 600 feet deep. About sixty men are employed and the 20-stamp mill is kept going day and night.

The Bullion mine is being worked under bond by Rood & Ladd. There are two veins. The shaft has been sunk to a depth of 150 feet on the front or hanging wall ledge. At this depth levels have been run east and west on the ledge, showing a strong vein of fair ore.

Plumas.

Independent: At the Little Jamieson at Johnsville twenty-five men are working on the outside, and by the first of the year it is expected as many will be underground and the stamps dropping. The mill is nearly completed.

The Plumas-Eureka is working with a much reduced force and no prospecting is being done for new ore bodies.

Many smaller properties in the neighborhood of Johnsville are being placed in condition for working in the spring.

National-Bulletin: At the Standart & McGill mine a small force will be employed during the winter, as the condition of the road to the mill renders hauling impracticable. It contains a large body of low-grade ore, which could be worked cheaply with a mill, which the owners contemplate building.

The Four Hills mine is operating. The mill has been crushing ore during the past month. About thirty men are employed in connection with this property.

Riverside.

Independent: The new 5-stamp mill on the Dennis mine, near Perris, has started up.

The stamps at the new mill at the Green Lead mine, Holcomb valley, are now working. About twenty men are employed on the mine.

The group of five claims at Twenty-nine Palms, belonging to Wilson and others, was sold last week for cash to some mining men from the Cripple Creek country.

A strike has been made in the Gavilan mine at Perris.

San Diego.

Los Angeles *Times*: The report of the receiver of the Golden Cross mines at Hedges for the month ending November 15, shows receipts of $37,999, of which $25,758 is for bullion from the mines. Over $10,670 was paid for labor. The bank balance is $5350, and cash on hand, $6615. All debts contracted by the receiver have been paid.

There is a promise of increased activity in the development of the Picacho district mines, near Yuma, Ex-Senator Steve Dorsey is at the mines. Representatives of the machinery firm of Fraser & Chalmers of Chicago have been investigating the prospect with a view to erecting mills. In the estimation of the experts, there is enough $4 ore in sight to keep a mill of 300 stamps at work for a year. One deposit is 300 feet wide on the surface. It is understood that Banker Moffat of Denver is behind Dorsey in the development of these mines. Dorsey expects to start for London in about ten days on business connected with these properties.

Shasta.

Searchlight: The reports that rich strikes have been made in the Uncle Sam are without foundation. It is true that several miners are yet at work on that part of the ledge remaining unstoped between the shafts, but all paying ore has been pretty well removed; and as the ledge extending each way from the mine contains no rock worth treating, it is not likely that any great discovery will be made suddenly in this once valuable property which has paid to its stockholders over $900,000 in dividends.

At the National Consolidated Company's mine a 10-stamp mill is in operation and about twenty tons of ore is being crushed daily. A large amount of good ore is in sight in the stopes and rock is being taken out in four different places on the ledge. A shaft is being sunk from the lowest tunnel to develop to a greater depth. The force at present consists of thirty men.

Free Press: At French Gulch the Niagara is not getting out a great deal of ore, but what there is of it is of good quality. It lies in kidneys and works over $100 per ton. Seven tons were shipped to Selby's Works recently and returned something like $1400.

Hooper & Hubbard, under lease from Myers, have been working new ground in the Empire and getting ore worth $40 a ton.

J. J. Kelly is doing well on an abandoned location a short distance from the Washington mill. He has a tunnel in 200 feet on the second contact and is getting out rich ore which he has worked in the Washington mill. He has 150 feet of backs.

Sierra.

Nevada *Transcript*: The Scotch Company which took hold of the old Alaska mine at Pike City, have had representatives on the ground, and William P. Miller, the mining engineer who passed upon the Jumper mine of Tuolumne for Glasgow investors, has reported upon the work necessary to drain the mine. It is understood that his estimate amounts to $200,000 for cost of a tunnel from the Yuba, which, when finished, would give the company about 1800 feet of "backs" ensuring a large reserve of ore. This programme of work will be recommended by the visiting agents.

Siskiyou.

Reporter: The work of taking ore from the Columbia mine has been suspended for the winter months, but a small force of men will be employed in running tunnels and preparing for a large force in the spring. The mill will be enlarged in the spring or during the winter.

M. F. Campbell, who has the Quartz Hill mine bonded, was here last week. It is reported the flume in the old Shores ditch is to be rebuilt, and the mill upon this mine put in operation. Mr. Campbell has been trying to effect a sale of this property to a New York company.

The outlook for water for the hydraulic mines is splendid at present, and we may expect large runs next season, which will add greatly to the production of gold in Siskiyou.

Yreka *Journal*: Nothing has been done towards starting up the Gold Ball quartz mine, near Sawyer's Bar, and the 20-stamp mill will probably not be in operation for some time yet.

The Salmon River Mining Company's hydraulic mine, about six miles this side of Sawyer's Bar, is nearly ready to start up. This is one of the best equipped hydraulic plants in Siskiyou county.

The Mabel mine, near Scott Bar, owned by Chamberlain & Timmons, has been closed down for the winter after a successful run. The mine will be opened up in the spring, as soon as the weather will permit.

The Classic Hill mine on Indian creek, near Happy Camp, owned by Mathews & Vogan, has two giants at work.

Yreka *Journal*: The Klamath River Dredging Company is at work near Oak bar, and will no doubt be able to continue nearly all winter. Their plant is the largest of the kind ever built in the northern part of this State, those on the Sacramento being much smaller. A large proportion of the river bed from Oak bar down to Happy Camp has been located.

At the Bunker Hill mine, below Happy Camp, the owners will make a good cleanup. They have an abundance of water to keep their giants in operation.

Trinity.

Redding *Free Press*: The Altoona Quicksilver Mining Company have their entire plant under cover and will continue operations throughout the winter season.

George L. Carr at Carrville is pushing the development of his mine. He has completed 500 feet of an 800-foot tunnel, which he is running through the mountain. When the tunnel is completed he will decide upon a location for a stamp mill, which he will erect upon the property early next spring.

The Brown Bear Mining Company of Deadwood have resumed the shipment of sulphuretic ore by freight wagon from their mine to Redding, from which place it is shipped to the Selby Smelting Works at Vallejo Junction.

Journal: The Chinese company that bought the old Wilshire mine at Cox's bar have had Tom Montgomery survey a new ditch high enough to cover Peabody hill. This is known to be a good piece of ground, but white men thought it not large enough to justify the expense of cutting a ditch.

At Taylor's flat the Highland Mining Company are running their mine in full blast, the recent storms giving them sufficient water.

Tuolumne.

(Special Correspondence).—There are ten men now at work on the Modoc mine, and it is

expected that the mill will be running about February, 1897.

James Closter has found another rich mine about one mile from Buchanan. The vein is 4 feet wide and assays $12 per ton.

Mr. Bailey, a mining man from San Francisco, has been here for the last week looking for some good, cheap mining property. There is lots of good mining property here, but it is not cheap.

The Lady Washington mine is running night and day. The tunnel is in over 800 feet and the winze chute has been struck. This will give 900 feet of backs and the rock assays $40.

Senator Shine and Dr. Bromley have three men at work on the Wade & Carter mine.

The Edinburgh mine will be started up about the 1st of January, 1897.

Mr. Sharwood is still at work on the Grizzly.

Carters, Dec. 4th, '96.

Union-Democrat: The outlook is favorable for everything to be going full blast at the Lady Washington in a short while. Work on the shaft is progressing with considerable speed. When the mill starts crushing, good returns are looked for.

The managers of the Whisky Hill have decided to put in a hoisting engine right away, so that the shaft can be sunk with more speed.

The pumps have been started up at the Dead Horse, to pump the mine dry preparatory to resuming operations.

The Alabama property has been listed in London for $600,000. Superintendent Nevills is continuing the work of straightening the shaft and will soon have the big pumps to work, then sinking will be resumed.

A new hoist is being erected at the Alameda, and the owners contemplate the erection of a mill in the spring.

The framework for the new mill at the Confidence is nearly completed. The building will be large enough for forty stamps, though it is understood that but twenty will be put in to start with.

Yuba.

Marysville *Appeal*: At Brown's Valley the Damiebroge mine keeps 20 stamps running regularly.

The Flag mine will be started up again soon.

The Hibbert & Burris 5-stamp mill is working regularly on ore from the Sweet Vengeance.

NEVADA.

Reno *Gazette*: Mining implements, lumber and supplies are daily freighted from Elko to Gold Creek. If the weather continues favorable a larger force will be put to work on the ditch.

The *Central Nevadan* says if the Adelaide copper mine near Golconda turns out well there will be 300 men at work in it before spring. English capitalists have put ten or twelve men at work prospecting the mine with a view of determining its value.

Walker Lake *Bulletin*: Twenty-eight tons of ore were shipped from the Big Indian mine last week to Stewart & Harrington's mill at Soda. It yielded about $70 per ton.

White Pine *News*: At Cherry creek the Imperial Mining Company put some men to work, last week, at Exchequer mine, some good ore has been discovered over 800 feet in the tunnel.

De Lamar *Lode*: On the Magnolia, the first claim located in this district, a rich chute of ore has been encountered in the tunnel, which is now in 834 feet. Samples gave an average value of several hundred dollars to the ton.

The death of Thomas Gillespie has stopped all work at the Sterling, in Nye county.

On the April Fool some good showings have been made. The work on the property is principally tunnels, of which they have in all about one mile. The expenditures will range between $100,000 and $150,000.

White Pine *News*: The mines at Egan have closed down for the winter. The reason assigned is that the process of wet crushing now in use at the mill cannot be continued during the winter on account of the extreme cold in the canyon. A dry crusher will be put in in the spring.

OREGON.

Democrat: Twenty men are being put on the Flick Bar Mining Company's ditch, near Baker City.

The Flagstaff Mining Company has between forty and fifty men on its pay roll.

The Columbia mill has been started up.

Jacksonville *Democratic Times*: George B. Dornin will soon put in an improved 5-stamp mill at the Jewett mine, near Grant's pass.

The Louse creek mines, owned by A. Helms and others, have been bonded to R. G. O'Brien of Olympia, Wash.

Pfeil Bros.' mines, on Gall's creek, are being fitted up with a hydraulic plant and will be operated this season more extensively than ever.

The gold output of Galice creek district will be larger than ever this season, owing to the fact that mining operations are more extensive there than ever.

Placer mines will probably make a good showing this year, as the wet season seems to have set in earlier than usual.

The pumps have been taken out and work suspended at the Hammersly mine.

J. H. Beeman of Gold Hill, who has bonded the Roten ledge in Kane's creek district for California parties, is engaged in developing the proposition.

WASHINGTON.

Spokane *Chronicle*: In the Okanogan district the principal claims being worked this winter are the Ivanhoe, Triune, Wyandotte, King Solomon and the Rainbow. Wyandotte ore can be treated by the cyanide process, and that company has just put up a large mill that will handle about fifty tons per day.

On the Similkameen river a concentrator with a capacity of 100 tons will be built by a company composed of mine owners who are operating on Mount Ellemeham.

The big tunnel started to run into Palmer mountain from 1400 to 2000 feet will cut some thirteen ledges.

BRITISH COLUMBIA.

The Turner and Puyton factions have settled their differences in the management of the Le Roi mine. About 125 tons of ore are being hoisted daily, and this amount will be largely increased when the two extra drills are in operation. They are now working on the 500-foot level.

Should a proposed Red Mountain tunnel prove successful, it is intended to tunnel the Monte Cristo and other ore mountains in the vicinity of Rossland.

Spokesman-Review: The Reco Mining Company has been incorporated. The mine is developed by six tunnels an aggregate of 5000 feet, besides numerous upraises and crosscuts. A large force is at work, and the president of the company states that a dividend will be paid by March 1st.

The shipments from the Slocan will be unusually large this winter. At the Payne the owners expect to ship 1000 tons a month. The Antoine is shipping about sixty tons of high-grade ore a month. The railroad men are figuring on forty mines making shipments this winter, and that the total output will be at least 3000 tons a month.

Victoria *Times*: The control of the Elise mine on Wild Horse creek has passed into the hands of the British Columbia Exploration Company. The price was on a basis of $75,000 for the entire property,

The Wasa group of mines has been sold, and the first installment of $5000 has been paid. The Wasa group is situated about twelve miles from Fort Steele.

The North Star Company are working thirty men, and will take out from 6000 to 8000 tons of carbonates during the winter.

Rossland *Miner*: Gen. C. S. Warren has sold for $30,000, to a syndicate headed by Lieutenant-Governor McIntosh of the Northwest Territories, the Spotted Tail group, which consists of the Spotted Tail, Ida and Ida Fraction.

ALASKA.

Mining Record: At Berner bay the Julian Mining Company is now working a force of thirty men.

The crosscut tunnel which it was necessary to drive to tap the Comet mine and drain the upper workings of a heavy surface seepage is now in about 1850 feet, and the new vein is expected to be cut by the last of December.

UTAH.

Park *Record*: The Silver King, which was closed down by the cutting of the water pipes crossing the Crescent, has resumed work; 250 men were thrown out of employment during the shutdown.

In La Sal district interest is centered in the copper prospects thirty miles southeast at the south end of La Sal mountains. Parties from Colorado and Philadelphia have bonded the Copper King properties, owned by Maxwell, May, Young and King, in the big Indian district, for $50,000.

Salt Lake *Tribune*: The Union Pacific reports a heavier output from the mines of Tintic than at any time in the history of that district.

A shipment of forty-five tons received from the Humbug shows 128 ounces silver, 14 per cent lead and gold of the value of $7.50 per ton.

At Eureka the Sioux-Ajax tunnel has reached the 1500 station and is pushing forward day and night, with a probability that an ore chute will be broken into before Christmas.

About twenty tons of ore are being taken out of the Humbug daily. The ore during the past week will average about 500 ounces of silver, although some assays run over 700 ounces.

Iron ore is in demand at the smelters, and the Dragon iron mine is now shipping regularly.

Tintic *Miner*: Shipments were made as follows during the week: From the Bullion-Beck mine, 20 carloads ore; Bullion-Beck mill, 10 carloads concentrates: Centennial Eureka, 5 carloads ore: Eureka Hill, 12 carloads ore: Gemini, 5 carloads ore: Mammoth, 4 carloads ore: Ajax, 18 carloads ore; Sioux, 7 carloads ore; Buckeye, 2 carloads ore: Sunbeam, 1 carload ore: South Swansea, 5 carloads ore; Homestake and King James, 1 carload ore together: Dragon iron mine, 3 carloads ore daily.

The crosscut from the Independent-Tesora shaft has struck a 22-inch vein of ore in the Tesora ground.

The ore strike in the Grand Central is large in size, but, as was expected, low grade. There is no doubt, however, but that the property has the Mammoth ore channel.

The recent run of North Star ore through the Sioux mill—1000 tons—yielded an average of $9 gold and 13 ounces of silver.

Tribune: At Mercur it is reported that the Utica is negotiating for a sale to Eastern parties. There are nine claims in the property.

An Eastern company has bonded the Lydia group, comprising four claims, and will develop the property.

Nearly seventy men are now employed at the Golden Gate, and the lower levels of the property are being developed.

The Swansea is cutting out its station on the 550-foot level and will begin drifting for the vein. By those who have recently examined the property it is said that there is more ore in sight than at any time since its development was undertaken.

At Bingham a deal by which F. F. Frishie and C. S. Vadner acquire title to a group of mining claims in Carr Fork, above the Frisco, has been perfected, and development will go forward throughout the winter.

The ore shipments from Bingham for the month of November reached a total of 2400 tons.

At the Northern Light mine near Mercur, from the time the ore is shoveled into the cars at the working face until the tailings are shoveled out of the tanks, the work will be done by gravity. It is estimated that the cost of mining the ore will not be more than 50 cents per ton and the entire cost of mining and milling will be under $2. The mill is ready for the machinery.

The Golden Gate is employing about forty men and running three shifts. The work is mainly in sinking the upper shaft and blocking out the ore body. No new indications appear in regard to the early erection of a mill.

IDAHO.

(Special Correspondence.)—A number of reported sales did not go through, not owing to lack of value of the several properties, but owing to an overestimated value proportionate to the amount of development work. The miners, or, rather, holders of property here, are inclined to hold their prospects at mine prices, consequently very little capital is being invested. By so doing the property holders of this section are not only detrimental to the camp in general, but to their own interests.

Contracts have been let for driving tunnels on the Banner and Gold Bug. Some good ore is being taken from the Gold Bug.

The Ozark mill and mine are closed down for the present. A deal is pending on this property which, if consummated, will place it in the hands of men capable of handling it. The vein is about 3 feet wide and carries about 2 feet of ore which will mill $10 per ton. The development work has so far been done on a rather crude scale, consisting, as it does, of 400 feet of tunnel, which opens it up to a depth of 50 feet.

The Waverly mine will resume work in a short time with a large crew of men.

The Florence Mining, Milling and Reduction Co. has been recently organized by Moscow capital for the purpose of operating in this camp under the management of A. Walker.

The Red Brick mine is producing some rich ore. This property is in the hands of Spottiswood, Foster & Co.

Mr. Ledrow and Mr. King were in camp last week and have made a deal on the Oregon. They propose sinking 100 feet on the vein. This property is near the Kid claim, formerly purchased by the same parties. Both of these properties are rich in gold, but sufficient development has not been done to demonstrate their value.

There are numerous good properties in this section which, if they could be bought for a reasonable sum, would undoubtedly make producing mines. This is a camp which offers no opportunity for tunneling, and the only way to open it up to any advantage is to sink, and the large quantity of water makes steam pumps indispensable. Snow is now 4 feet deep, but it offers no obstacle when there is profit.

Florence, Dec. 5.

MONTANA.

Inter-Mountain: The final steps are being taken toward the reorganization of the Butte & Boston Co. The reorganized company will start with about $1,400,000 cash in its treasury, $1,500,000 6 per cent bonds, 200,000 shares outstanding, a finely equipped smelter in Meaderville and a rising copper market.

The contract for the new plant of 120 stamps, with both steam and electrical power, for the Diamond Hill gold mines, limited, has been awarded to the Union Iron Works of San Francisco. The mines are being opened with a large force of men. An air compressor with a capacity of ten drills will be used, driven by electricity, enabling the company to mine and reduce the ores in the plant for not to exceed 75 cents per ton.

The Gold Dredging Company has spent over $200,000 on the plant at Bannock and for the first time the work has been successful during the past summer. A satisfactory cleanup of gold from the creek bottom has been made for the summer's work. In May, 1896, Mr. Reiling conceived the idea of a boat with an endless chain of buckets working on a cable that would bring up the gravel from bedrock. The boat was constructed and twenty-seven buckets attached to the chain. As each bucket reaches the bottom of the creek it fills and the revolving chain brings it around to the top, where the load by an automatic arrangement is dumped into the grizzly. A stream of water is constantly playing on the gravel as it is dumped, and the smaller gravel and loose gold fall through the bars and is carried away through a flume.

Mining World: The Washoe Company has completed the new hoisting plant and shaft house on the Moonlight, and has three shifts at work sinking the shaft. The depth necessary to cut the lead will be about 1000 feet.

SOUTH DAKOTA.

Black Hills *Times*: At the Union Hill properties the experimental smelter is working thirty tons of ore a day, which yields nearly a ton of bullion: this bullion is worth from $250 to $300 per ton. About 100 miners are employed developing the various properties, and in every instance the ore bodies are large and have the appearance of permanency.

The Amazon Mining Company has about completed arrangements for the erection of a 20-stamp mill on their property, near Custer peak. The workings show a vein 30 feet wide, free-milling in character, which will yield from $4 to $5 gold per ton. With a 20-stamp mill, the cost of milling and mining should not exceed $2.50 per ton.

MICHIGAN.

Reports recently that the Calumet & Hecla Mining Co. contemplated building a new stamp mill are not correct. The company does not contemplate erecting any new stamps. It is expected that the Red Jacket shaft will be completed ready to hoist rock some time in '97, but it has not been determined when they will begin to hoist rock in it. This shaft is in the conglomerate lode and has been sunk to a depth of 4 00 feet, passing through and far below the lode. It was planned more as an insurance against interruption by fire in the other shafts in the future than for increasing output. At present the other shafts of the Calumet & Hecla supply all the copper it is deemed wise to raise from the mine in the present state of demand and supply. It can therefore be said that it is impossible to predict when the conditions will so alter as to make it desirable for the company to start hoisting from the Red Jacket shaft. The Calumet & Hecla has declared a dividend of $5 per share payable next Thursday. This makes $25 per share this year, and a total in dividends of $46,850,000.

In the Tamarack Mining Co.'s property the openings south of No. 3 shaft are exposing a lode from 16 to 18 feet in width which is rich in copper from the foot to the hanging wall, and is much better than the average of the mine. The general appearance of the lode in and about Nos. 1 and 2 shafts is about the same as for the past year. Everything in and about the mine seems to be running regularly and well.

The group of mines known as the Huron, Grand Portage and Isle Royal, south of Houghton, Mich., are reported sold. Operations will be started on one of them early in '97. The price mentioned as being paid for the group is about $125,000. Twelve years ago the Grand Portage and Isle Royal produced both together about 270,000 pounds of copper per annum: the Huron has produced as high as 2,370,000 pounds in 1888, but has done little or nothing the past three years. There is also a plan on foot to revive operations at the Ridge mine by calling an assessment of $1 per share if the approval of stockholders can be obtained.

COLORADO.

Denver *Republican*: At Cripple Creek the new main shaft of the Pharmacist has reached a depth of 350 feet.

The Anchoria-Leland company has made a shipment of two tons of ore expected to run not less than 250 ounces, or $5,000 to the ton, making one of the richest shipments in such quantity that has ever been made from the camp. Development at the mine goes on steadily, with the output holding at about $50,000 a month.

The output from the Isabella this month will be slightly heavier than last. The new ore in the seventh level proves to be the most important find made for many months.

If the several mines of the district follow their usual rule of increasing output in December, there will not be the least question but that the production of the Cripple Creek district for the present year will reach $10,000,000 and that in spite of the heavy loss occuring through the reduction of the Portland yield by the loss of the Anna Lee ore chute and from the Independence through its having shut down during the greater portion of the year.

It is said that W. S. Stratton is preparing to make the largest shipment of ore ever made from a gold mine to a smelter in thirty days, from the Independence property in December.

At Silverton the Royal Tiger has thirty mules at work on the trail, carrying ore to the mill and supplies to the mine.

Experts have been in the city to report on the Black Diamond, lying between the Iowa and Silver Lake.

The Shenandoah on Solomon mountain has made a big strike of rich ore. The mine has shipped about ten cars of ore, and the output will soon be increased.

The Guston management has decided to continue work during the winter. A development shaft 200 feet deen will be sunk.

The North Star on Solomon mountain will be worked all winter by a large force of men. The dump, which has been accumulating for the past ten years, is being shipped at the rate of eighty tons per day, and returns an average of $18 per ton. The mine is still shipping high-grade gray copper.

An effort is to be made to start up the mines and mill at Summitville, Rio Grande county. The mines in that district were once phenomenally rich.

Present indications show that the season of 1897 will be one of marked activity in a placer mining way in Routt county. The Hahn's Peak Mining Company propose as soon as spring opens to begin the enlargement and repair of flumes on their Elk river ditch. This ditch is nineteen miles in length. This company owns and controls about 2500 acres. The Willow Canyon Placer Company, controlling an equal amount of ground, will also put in a line of ditches to tap the same stream. These properties both lay at the southern base of Hahn's peak.

On the north side of the peak, a company composed of Illinois men have secured 1800 acres of ground, covering what is known as Red park. This ground has been located and abandoned for twenty years or more. This company will also construct a large ditch next season to take water from the south fork of Snake river.

Twenty Mile park will be represented by two hydraulic companies, one of these used giants the last season with good results, while the other will construct a ditch and reservoir and put in a plant early in the spring. Four Mile will be fully represented in the outfit of producers, while a dredging plant is being worked up to handle the sand bars of Bear river below the mouth of Fortification creek.

A number of the old mines in and around Capitol City will be started in the spring. It is authentically reported that the big Frank Hough mine will be put into shape early next spring and operated on an extensive scale.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DECEMBER 1, 1896.

572,103.—SPRING HEEL—J. Bresman, S. F.
572,353.—AMALGAMATOR—W. L. & C. Brown, S. F.
572,469.—CIGAR TRAY—J Buchtel, Portland, Or.
572,331.—TOILET PAPER HOLDER—E. D. Casterline, San Jose, Cal.
572,408.—SASH FASTENER—C. J. Clarke, Kingsburg, Cal.
572,116.—CAR COUPLING—T. Fales, Bridgeport, Cal.
572,342.—REFINING BULLION—F. Gutzkow, S. F.
572,200.—SOLDER—G. Hammond, Mulberry, Cal.
572,167.—VENTILATED RECEPTACLE—W. E. Howell, Los Angeles, Cal.
572,360.—CAN HEADER—R. D. Hume, Gold Beach, Or.
572,362.—FLOUR DREDGE—W. D. F. Loryea, S. F.
572,305.—WIRE ROPEWAY—J. T. Ludlow, S. F.
572,345.—BUNG—C. J. Meyerholz, Mountain View, Cal
572,310.—DENTAL ENGINE HAND PIECE—C. O. Perkins, Petaluma, Cal.
572,127.—ROTARY ENGINE—R. Schlegel, S. F.
572,221.—FRUIT DRIER—A. B. Shearer, Arroyo Grande, Cal.
572,320.—CARD CUTTER—P. J Stuparich, S. F.
572,387.—BOTTLE—M. & L. W. Tebbetts, San Diego, Cal.
26,358.—DESIGN FOR HOSE NOZZLE—Kelly & Olson, Seattle, Wash.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TOILET PAPER HOLDERS.—Edwin D. Casterline, San Jose, Cal. No. 572,331. Dated Dec. 1, 1896. This invention relates to serving apparatus and particularly to devices for holding toilet paper. It consists essentially in folding the paper alternately so that each sheet is interlocked with the next adjacent sheet, one leaf being folded over the leaf of the preceding sheet. The edge of the outer sheet projects through a slot or opening in a box or case which is closed upon all sides, and has a centrally located discharge slit through which the paper is withdrawn and means for introducing the paper thereinto. The enclosing box is placed in a permanent holder which has a locking spring or means for retaining the whole in place until the paper has been exhausted, when its containing box may be removed and another one inserted in its place, being locked in the same manner until the paper is exhausted.

CUTTERS FOR BEVEL CARDS.—Paul J. Stuparich, San Francisco, Cal. No. 572,320. Dated Dec. 1, 1896. This invention relates to an apparatus which is especially designed for forming beveled openings in cards or tablets which are designed for photographic mounts and other purposes. It consists essentially of a table, a removable plate secured thereon having a bevelled central opening, a vertically movable clamping plate having a bevelled opening made centrally therein, a vertical shaft turnable above the clamping plate with a transversely adjustable bar carried by the shaft having a head upon its outer end, a cutting blade, a means for clamping it to the head so as to stand at any desired angle and a means for rotating the shaft and the blade.

HAND PIECE FOR DENTAL ENGINES.—Charles O. Perkins, Petaluma, Cal. No. 572,310. Dated Dec. 1, 1896. This invention relates to a novel hand piece for dental engines. It consists essentially of a combination of parts whereby the bit or tool is easily introduced and removed with small loss of time. A rotatable spindle has a longitudinally split double coned socket at the end with the coned bases toward each other. A pin extends across from one side of the slit to the other and is adapted to engage and lock the flattened grooved shank of the tool after the latter is inserted, a ring is slidable upon the inner cone to clamp the two in place, and a casing enclosing the whole consists of a central and two end sections adapted to screw together, an opening being made in the front end section through which the sliding ring is movable while an adjustable collar fixed to the spindle abuts against the outer end of the central section of the casing.

AMALGAMATOR.—Wilfrid L. and Calvin Brown, San Francisco, Cal. No. 572,353. Dated Dec. 1, 1896. The object of this invention is to provide means whereby the ores after being properly pulverized and immersed in the solution placed in the tank so as to constitute a pulpy or fluid mass, may be given a rotary or circulating motion by the action of exhausting and discharging devices so that the pulp is continually caused to impinge upon the curved amalgamating plates within the tank, and thus the particles of metal are continually brought into contact with these amalgamating surfaces so as to eventually attach them thereto. In conjunction with this mechanism are electrodes suspended within a tank and connected with a source of electric energy whereby the action is more perfectly carried out.

FLOUR OR CONDIMENT DREDGE.—Wm. D. F. Loryea, San Francisco, Cal., assignor of one-half to E. S. Rosenblat and I. S. Rosenblat of same place. No. 572,362. Dated Dec. 1, 1896. This invention relates to a dredge for the sifting and discharge of flour, salt, pepper, spices and similar substances. It consists essentially of a containing chamber having a removable cap with radial perforations made therein, a longitudinal central shaft extending through the container, with a head fixed thereto having radial arms which normally coincide with and close the perforations in the cover. There is an enclosed case in the lower part into the inner end of which the shaft extends, and spiral threads are cut upon the shaft to engage with a direct reciprocating slide which surrounds the shaft within the outer case, having lugs which engage the spiral grooves in the shaft and a returning spring pressing against the end of the slide so that by the reciprocating movement of the slide, the rotary movement of the shaft and the arms upon its head is effected. This movement stirs up the material within the box and the latter being reversed alternately covers and uncovers the holes so as to sift and discharge the material there through.

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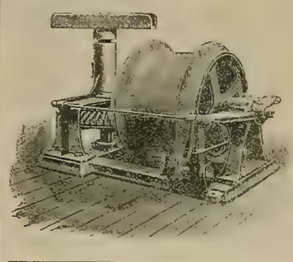

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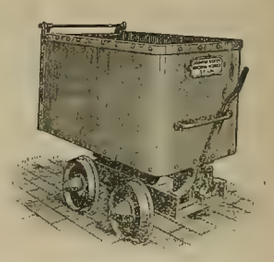

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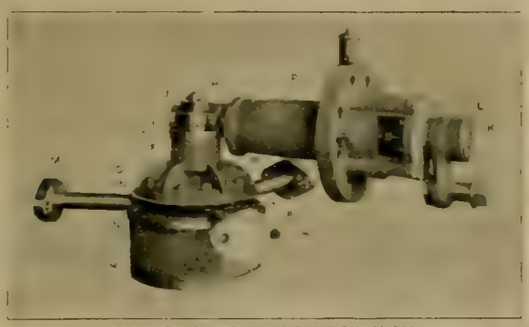

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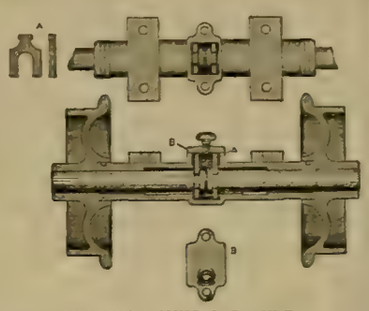

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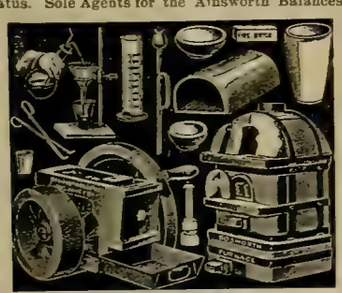

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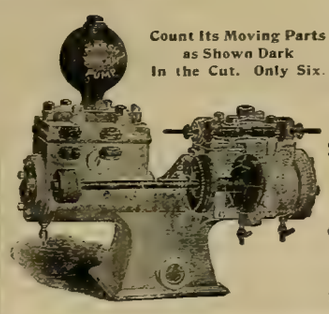

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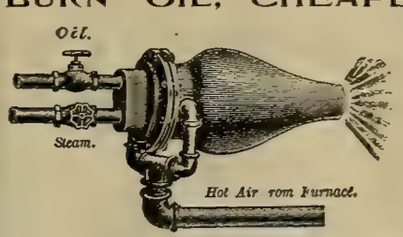

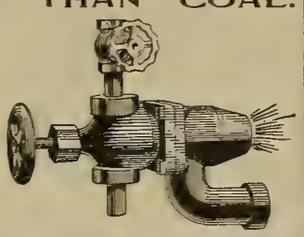

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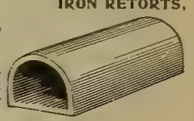

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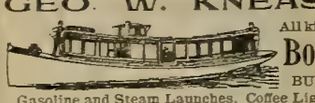

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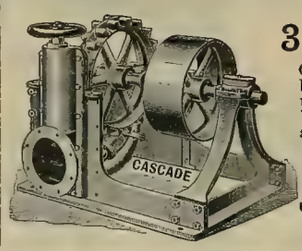

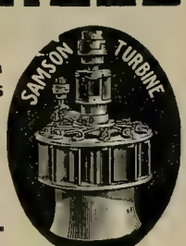

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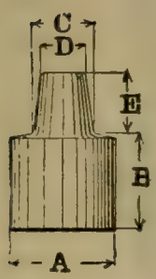

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D=..... "
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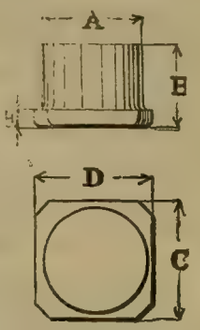

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B=..... "
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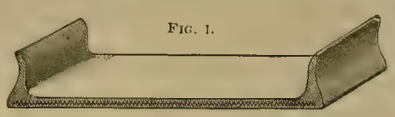

FIG. 1.

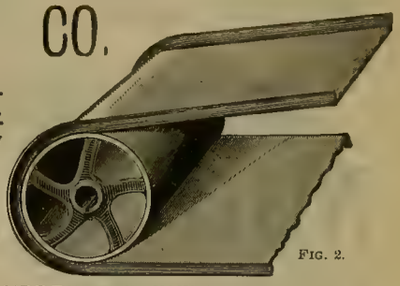

FIG. 2.

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SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.

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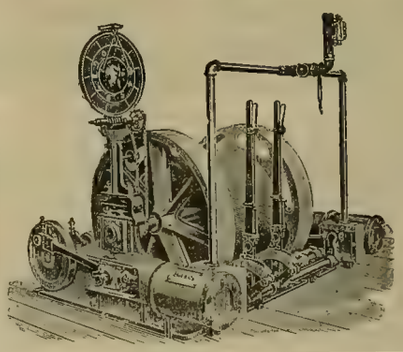

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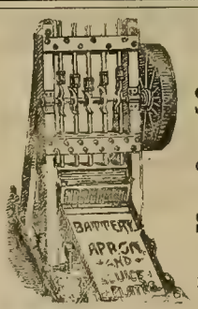

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Adopted, Used and In Force in Accordance with State Law.

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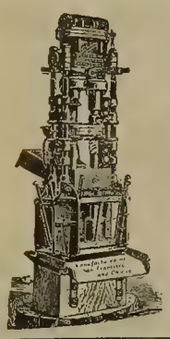

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Total Weight, About 5000 Pounds.

It requires no belting, shafting, pulleys or building.
Can be transmitted in section or whole. Well acapted to localities difficult of access. Weight, 3000 pounds.
Its practicability was fully demonstrated by its enormous sales of 1895, which exceeded those of two former years, and is now in successful operation in Africa, Alaska, Mexico, Colorado, South America. California Canada, Montana, Oregon, Central America, Arizona, Dakota, New Mexico, Wyoming, etc.

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For Hydraulic Purposes, made from the Best Sheet Steel, Single or Double Riveted, Dipped or Undipped.

We will ship Pipe cut and punched, to be riveted at the mine, making a saving in freight charges.

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SHEET IRON WORK OF ALL KINDS.
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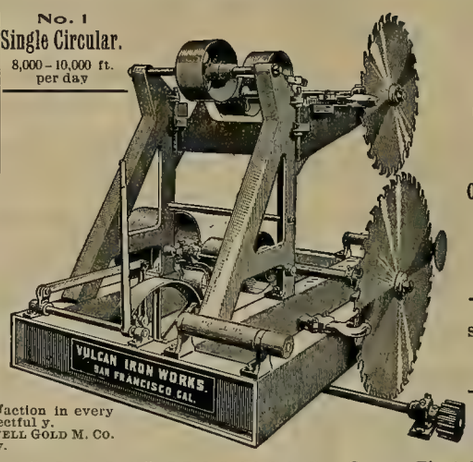

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SAN FRANCISCO.
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CHROME CAST STEEL

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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GOLD BARS, SILVER BARS and MILL PRODUCTS.

SMELTING WORKS:
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We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Moreing & Neal's Code and Bedford McNeill's Code.

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AMALGAMATION AND CONCENTRATION PLANTS.

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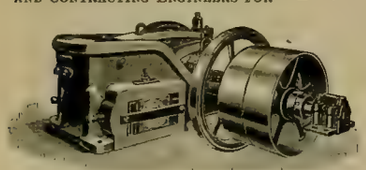

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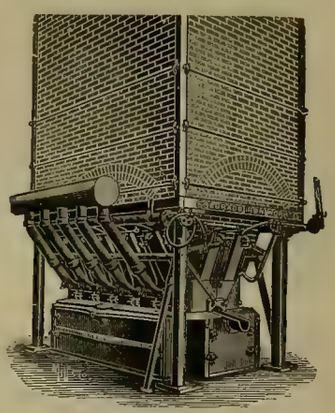
OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

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For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

San Francisco Novelty and Plating Works

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11 AND 13 FIRST STREET, SAN FRANCISCO, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 10, 1896.

Jobbers report that business is good in nearly all lines, with the call for holiday specialties exceptionally free. The volume of goods that went out on orders the past three months shows an increase of from 15 to 25 per cent over that during the corresponding time last year. The outlook is very hopeful for next years' business. With jobbers and others having close connection with the agricultural sections the opinion is freely expressed that their information is to the effect that a larger acreage will be seeded to wheat this year than any in the history of the State, and with that cereal commanding an average of $1.20 a cental farmers will come out with good profits. Jobbers connected with the mining district state that next year will not only witness a continued boom, but an enlargement in the gold mining industry. This improvement will not be confined to California alone, but extend to every State and Territory on the Pacific slope. In manufacturing circles there is a more cheerful feeling notwithstanding strong competition from the East, owing to cheap freights, cheaper raw material and lower wages.

The local money market is practically unchanged; the available supply in bank is steadily increasing, and as the avenues for placing money at good rates of interest decrease the rates of interest will ease. There is some calling in of funds by insurance and other companies to meet dividends, interest, etc., in next month, but it does not create friction. It is the consensus of opinion in financial circles that considerable more money will be offering after next year has been well entered. Considerable amounts will go out for the interest it will fetch, while there will be more disposition to invest in channels that offer special inducements for good returns. The East continues to report an easy market, with no decided demand for funds. The easy market at New York is causing more money to be invested in first-class securities, and also inquiry into the possibility of securing good investments in industrial and mining properties.

New York Silver Prices.

NEW YORK, Dec. 10.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	29⅞	65⅛
Saturday	29⅞	65⅛
Monday	29⅞	65⅛
Tuesday	29⅞	65⅛
Wednesday	29 15-16	65¼
Thursday	29 15-16	65¼

	Copper.	Lead.	Iron.	Tin.
Friday	11 30	3 02½	11 00@13 00	12 90
Saturday	11 30	3 02½	11 00@13 00	12 90
Monday	11 30	3 00	11 00@13 00	12 95
Tuesday	11 35	3 00	11 00@13 00	13 00
Wednesday	11 35	2 97½	11 00@13 00	12 95

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, ⅝ per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	10c Prem
New York Telegraphic Transfer	12½c Prem
London Bankers' 60 days	$4.84¼
London Merchants	$4.83¾
London Sight Bankers	$4.87½
Refined Silver, peroz., 1000 fine	65¼
Mexican Dollars	51½@52½

SILVER.—By referring to quotations above it will be seen that the market at the East and abroad held steadily up to Wednesday, when it strengthened slightly. From the general tenor of advices it looks very much as if better prices will rule after the turn of next year. This opinion is formed from information that the Indian Government is debating the question of going into the market to buy silver in connection with the financial pressure in that country due to famine. It may be induced to this course so as to offset any contemplated movement by Russia to coin silver so as to be prepared to make an entering wedge in the India trade.

MEXICAN DOLLARS.—The market has a stronger tone with a fair demand ruling.

QUICKSILVER.—There is a fairly active call for the close of the year for shipment by rail and water.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

COPPER.—There is a fairly firm tone to our market with a light inquiry ruling. Eastern advices state that the markets are firm with the tendency to advance owing to continued heavy consumption abroad and an increasing demand in this country with no corresponding increase in the output.

Ingot, jobbing	14¼@—
Ingot, wholesale	13½@—
Sheet copper	17 @—
Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing	20

LEAD.—The market is barely steady owing to lower prices coming through from the East. The demand is light.

Our market is quoted as follows:

Pig	—	@	3 75
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is a good seasonable demand.

Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs			$1 20
Drop, B and larger sizes,	"	"	1 45
Buck, Balls and Chilled, do,	"	"	1 45

ANTIMONY.—Our market is quoted at 7½@8c in a jobbing way. New York mail advices quote 7¼@7½c for Cookson's, 6⅜@6⅝c for Hallett's and 6⅜c for Japanese, from store.

BORAX.—There is nothing new to report in the market.

The market is quoted as follows:

Refined, in car lots	5
Refined, in sacks	4¾
Powdered, in car lots	4½
Concentrated, "	5

TIN.—In both pig and plate business is light. The canning season will start up sometime in next month when there will be a better demand. According to the New York Metal Exchange the visible supply of pig for Europe and America was 33,303 tons on Nov. 3, this is a decrease of 180 on the supply October 31.

Pig, per lb	14¼c@—
Plate, I C coke, heavy, per box	—@$4 05
" " " light, "	—@3 95

IRON.—All information at hand justifies the belief that lower prices will be quoted next year. The decline in steel rails for next year's delivery has its influence as has stronger competitive selling of pig iron for delivery in next year.

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

POWDER.—There is nothing new to report. The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, " "	8½c

COAL.—The demand shows an enlargement for both steam and domestic, but owing to the liberal supply on hand and to arrive the market is steady. The advance in freights from Europe and Australia has a favorable influence.

LUMBER.—There is a good outward movement.

Redwood, Fluming	17 00	@	— —
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.—The market is essentially unchanged.

The market is quoted as follows:

Wire, carloads, basis per keg	
" jobbing, " "	$2 75
Cut, carloads, " "	
" jobbing, " "	2 50

Mining Share Market.

SAN FRANCISCO, Dec. 10, 1896.

The market has fluctuated to lower prices. The first decline was brought about by reports received that the crossdrift on the 400-foot level of Chollar, on the Brunswick lode, was a failure. It was quite generally believed by the public that when the downward continuation of the ore was struck on the 400-foot level it would be wider and assay higher than that on the 300-foot level, and finding that the assays are low has been a decided disappointment. Under their selling the Chollar shares broke badly, causing lower prices for the entire list An assessment was levied by Hale & Norcross and another by Con. Virginia. While they were expected, yet the bears seized the opportunity to sell the market down. From the high prices of ten days ago the market was sold down from 40 to 65 per cent. The heavier decline was in Chollar and Potosi. It is stated that the 500-foot level will be opened soon for exploiting, but it is not at all likely any better results will follow. This opinion is hazarded on the work done years ago by the old Sutro Tunnel Co., when it struck the Brunswick at a depth of 1361 feet from the surface. Along this lode a drift was run northward and southward a distance of 100 feet. The vein was found to be a very strong one, and increasing in width as it sloped down from the surface, being about 100 feet wide at the tunnel level. The ore was found to be of a low grade. There can be no doubt that some day, when expenses have been further reduced, this ore can be extracted and taken out through the Comstock tunnel and made to yield a profit, but it cannot be made to pay from the surface workings unless a body of higher grade ore should be found. The work that is being done on the Brunswick lode does not attract attention, so the public is again turning to the Comstock.

From the Comstock mines there is very little of encouragement coming to hand. While the letters are devoid of interest, they tell of more or less work being done in the leading mines; and the well-known fact that, when least expected, a body of good to high grade ore has been struck which gave new life to it, causes many to believe that some such a surprise may yet take place. At present there does not seem to be any indications, so far as official information made public is concerned, to justify the expectation of a strike in the near future. The Alta letter reports that they are sinking on a streak of ore west of the bottom of the winze in the Keystone vein, which shows improvement. The ore assays $26.30 a ton. In Overman they are working on the 900-foot level. A few tons of about $30 ore are raised each week. Seg. Belcher and also Belcher continue to raise a few tons of ore each week while working on some unreported levels. Work had not, at last advices, been resumed in Crown Point. The work in Yellow Jacket continues to be kept quiet. In Confidence, Challenge and Con. Imperial there is no change in the work, so far as official letters report. In running the crossdrift in Alpha stringers of quartz continue to be cut. In Bullion work is continued in the north drift, with no change in formation reported and none expected for the better. In Potosi it looks as if preparations are being made to exploit the west croppings quite thoroughly. It is the belief that, if the work is run in the right direction, something of importance will be found. From Chollar nothing new comes to hand. The work is on the same levels heretofore reported. The work in Savage ought to begin soon to show to better advantage. In Hale & Norcross exploiting work is still the order. Now that the company has the Brunswick workings disposed of, all its resources will be bent toward finding a body of ore on the Comstock. Best & Belcher and Gould & Curry continue to drive ahead the joint east crossdrift. The material encountered does not show much encouragement. In Con. Virginia work is still being done on the 1000, 1650 and 1750-foot levels. So far as official letters are concerned, shareholders have very little to hope for soon unless an unexpected ore body is run into, which is not at all likely to take place. The number of tons raised last week was less than the preceding. In Ophir the west crossdrift on the 1000-foot level is being pushed ahead. On the Central tunnel they are driving a south drift. In this drift they passed through a quartz formation giving low assays. Work in Mexican is still toward the west on the 1000-foot level. Another crossdrift has been started. The work in Union is on the 900-foot level. In Sierra Nevada they are still working on the Layton tunnel level and also on the 900-foot level. In Andes they are running a west crossdrift on the 420-foot level.

From the Brunswick lode official advices are not of an encouraging character, so far as the immediate future is concerned. In Occidental they are exploiting the 550-foot and 850 foot levels. In Chollar they have not as yet found anything of consequence on the 400-foot level. The ore veins are wider, but poorer in grade. It is expected that work will soon be commenced to run a south drift from the Hale & Norcross 500-foot level. The expense of running north through Hale & Norcross ground will have to be borne by Chollar and running south by Savage. There is no particular change in the work that is being done by Savage, Gould & Curry and Best & Belcher.

It is expected that work will soon be completed of consolidating under one management Bodie, Bulwer, Mono and Standard, to be known as the Con. Standard, on the following basis: For two shares of Bodie one share of Standard will be issued, for three of Bulwer one of Standard and for six of Mono one of Standard. The new company will start out with $50,000 in cash and 21,000 shares in the treasury. The capital stock is 200,000 shares. The Standard shares sold this year as high as $3 a share. This mine has paid in dividends to the present time $5,400,000, and it is expected that, under the new management and consolidation, dividends will be again the order. There are 400,000 tons of tailings on the dump, which will be worked to advantage next year. The two cyanide plants have been shut down for the winter. Next spring more active work, it is reasonable to assume, will be inaugurated. The outlook for this district is quite hopeful, for the new management will work the mines on a legitimate business proposition.

Under date of Dec. 2nd, F. H. Pettingell writes from Colorado Springs, Colo.: "Those who write comments on mining stocks will be obliged to exert their ingenuity to a phenomena extent in order to satisfactorily explain the cause of the present slump, and those who are inclined to periodically predict glowing futures for everyone will find it exceedingly difficult to do so in a manner that will have weight with those who are disposed to think over matters. The principal trouble is that there is no outside demand for anything, and it is impossible for stocks to advance unless there is. The entire market is in an extremely sensitive condition. At the least sign of advance there is a general scramble to get in, but anyone who is at all familiar with the present situation can not conscientiously attempt to deny that the scarcity of buyers is positively appalling, and particularly so to those who are conducting large offices at great expense and carrying on a mining stock brokerage business in a high class manner. These are times when the most contented ones are the curbstone brokers, with offices in their hats. They have nothing to worry about, and comfortably recognize the advantage which they have over their more prosperous brethren of better times. There is another class who are also eminently well satisfied, and not at all effected by adverse conditions. These are the miners themselves who have passed through the siege of knocking unsuccessfully at the door of eastern capital, and amid hardships were forced to utilize their own resources, and develop their properties themselves which were industriously hawked about the country, and scorned by those who could have well afforded any possible loss that might accrue from an attempt to demonstrate their failure or success. The scorned miner is now the fortunate possessor of a dividend payer, and is enjoying the fruits of his numerous personal sacrifices cloaked in the garb of regular dividends. I believe that if every mine was forced to depend upon itself, and the enterprise of local capitalists, it would be far better in the end. What little amount of money we secure from the East is at an enormous sacrifice, and the profits are quickly absorbed and nothing said of them, but whenever a mining proposition fails, and there is any Eastern capital identified with it, there

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Channel Bend M Co	5	2c	Nov 9	Dec 12..Jan 2	J P Langhorne, 39 Sutter
Con Cal & Va M Co, Nev	7	25c	Dec 8	Jan 14..Feb 4	A W Havens, 309 Montgomery
Crown Point G & S M Co, Nev	69	10c	Dec 9	Jan 13..Feb 3	Jas Newlands, Mills Bldg
Eureka Con Drift M Co	5	5c	Nov 24	Dec 28..Jan 18	D M Kent, 330 Pine
Exchequer M Co	39	5c	Nov 14	Dec 17..Jan 11	Chas. E Elliott, Nevada Block
Greenwood G M Co. Cal	1	2c	Oct 16	Nov 23..Dec 14	Chas E Elliott, 309 Montgomery
Hale&Norcross S M Co, Nev	110	25c	Dec 8	Jan 11..Feb 1	R U Collins, 331 Pine
Horsefly G M Co	1	25c	Nov 4	Dec 21..Jan 20	R T Ward, 610 Clay
Horse Shoe Bar Con M Co	5	10c	Oct 29	Dec 5..Dec 26	D M Kent, 330 Pine
Jamison M Co	9	5c	Nov 27	Jan 25..Mar 22	Sam W Cheyney, 120 Sutter
Marguerite G M & M Co	4	20c	Sept 21	Nov 10..Dec 15	Chas Peach, 237 12th
Mt Diablo M & M Co	5	10c	Oct 27	Nov 30..Dec 21	R W Heath, 318 Pine
North Gould & Curry, Nev	17	10c	Nov 4	Dec 5..Dec 23	C H Mason, 337 California
Occidental Con M Co	25	15c	Nov 24	Dec 29..Jan 18	A K Durbrow, 309 Montgomery
Overman S M Co	76	10c	Nov 28	Dec 31..Jan 22	Geo D Edwards, 414 California
Reward G M Co	16	2c	Nov 11	Dec 14..Dec 30	S W Backus, Mills Bldg
Silver King M Co	15	25c	Oct 26	Dec 7..Jan 5	J W Pew, 310 Pine
Thorpe M Co, Cal	4	5c	Oct 14	Dec 22..Jan 9	A F Frey, 567 Market
Ybarra G M Co, Lower Cal	6	10c	Dec 4	Jan 6..Jan 25	Jas Comn, 132 Market

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Andes S M Co. Nev	J W Twiggs, 22 Nevada Block	Dec 18
Gould & Curry S M Co. Nev	A K Durbrow, 69 Nevada Block	Dec 21

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On advertising you can get; but don't act on it unless it appeals to your own judgment.—Printers' Ink, N. Y., Dec. 2, 1896.

lsan immediate howl about the loss, and the dishonesty of the enterprise, and in fact everything that can be invented to cry down mining. Thousands and thousands of dollars are wasted in the pursuit of Eastern capital, and in the majority of cases without results. The most fortunate mining operators have brought about their success through their own efforts, or with the assistance of local capital. The East will buy a few hundred shares of wild cat stocks, or they will buy a large block of listed stock at $1.00 per share when it is selling at $1.30 here, and the moment they get it in their possession they throw it back on the original sellers at 25 to 50 per cent profit; in other words the ordinary Eastern mining investor will not buy unless they are assured they are getting the best of it. They seldom place any confidence in the promoter."

The following illustrates the changes of the week:

MINES.	Dec. 3.	Dec. 10.
Alpha		
Alta Consolidated		$ 04
Andes		11
Belcher	$ 38	33
Best & Belcher	74	55
Bodie		
Bullion	13	10
Challenge		25
Chollar	1 70	95
Confidence		
Consolidated California and Virginia	1 55	1 10
Consolidated New York		
Crown Point	26	18
Exchequer		
Gould & Curry		31
Hale & Norcross	1 00	91
Justice		
Mexican	48	42
Ophir	1 15	95
Overman		
Potosi		54
Savage	40	33
Sierra Nevada	47	39
Union	41	09
Utah		05
Yellow Jacket		27

San Francisco Stock Board Sales.

SAN FRANCISCO, December 10, 1896.

9:30 A. M. SESSION.

100 Belcher	33	600 Occidental	17
250 Chollar	95	150 Ophir	95
150 Con Cal & Va	1 10	500 Potosi	54
50 Crown Point	18	400 Savage	33
800 Gould & Curry	31	100 Sierra Nevada	39
100 H. & N.	91	500 Utah	05

SECOND SESSION—2:30 P. M.

150 Ophir	91	800 Yellow Jacket	27
100 Mexican	42	100 Belcher	33
200 Gould & Curry	30	200 Sierra Nevada	38
100 Best & Belcher	55	100 Bullion	10
700 Con Cal & Va	1 05	600 Union	09
300 Savage	30	600 Alta	04
970 Chollar	90	100 Challenge	25
1900 Potosi	50	500 Occidental	13
100 H. & N.	90	100 Andes	11
200 Crown Point	17	200 Bulwer	36

ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Gould & Curry Silver Mining Company will be held at the office of the Company, Room No. 69, Nevada Block, No. 309 Montgomery street, San Francisco, California, on MONDAY, the 21st day of December, 1896, at the hour of 1 o'clock P. M. for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Friday, December 18, at 3 o'clock P. M.

ALFRED K. DURBROW, Secretary.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from C. W. & W. Martin, in the North Star mine, near Placerville, El Dorado Co., to deposit tailings in White Rock Creek; from Stevens, McKenney & Co., in the Boulder Hill mine, near Placerville, El Dorado Co., to deposit tailings in Kingoid creek; from Ah Sing, in the Hayden Hill mine, at Green Valley, Placer Co., to deposit tailings in an old pit; from George W. Jones, in the Buckeye Hill mine, near Nevada City, Nevada Co., to deposit tailings in a ravine; and from A. H. Holgate and others, in the Golden Gate mine, near Onion Valley, Plumas Co., to deposit tailings in Winter's creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on December 21, 1896, at 1:30 P. M.

WANTED,

A position as Superintendent or Assistant Superintendent in copper-silver or silver-lead smelting works.

Understands mining, sampling, assaying, furnace management, handling men.

Prefer Mexico or Spanish South America. Speaks Spanish. Best references.

Address METALLURGIST, this office.

WANTED.—A position by competent and experienced Mining Engineer and Metallurgical Chemist. Thoroughly understands mining, mining machinery, assaying, ore treatment (including cyanide, chlorine and bromine) and handling men. Can take the tools from any miner's, mechanic's or machinist's hands and do his work. Can survey, draft, and keep books. Also understands electricity. Best of references. Will go anywhere. Address M. E. and C. E., care Mining and Scientific Press, San Francisco, Cal.

WANTED.

A Large Gold or Copper Property, located anywhere from Alaska to Mexico. Must have ore body developed 200 to 300 feet deep, with a large amount of payable ore actually in sight. Or a property with a large body of payable ore exposed sufficient to warrant extensive development work. No small property wanted. Send complete description to M. KUHN, 12 Front St., San Francisco.

WANTED.—A1 Mine Superintendent. State references and salary expected. Address Box 37, this office.

British Columbia.

W. J. R. COWELL, B.A., F.G.S., Mining Engineer, Reports on mines, designs and superintends the erection of mining and milling machinery; makes analyses of ores, metals, soils, etc.; arranges for mill tests, and selects suitable processes for the treatment of ores. Correspondence invited. Address W. J. R. COWELL, Victoria, B. C.

Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star mining district, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 24th day of November, 1896, an assessment (No. 25) of fifteen (15) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 18th day of January, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 27th day of November, 1896, an assessment (No. 2) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of January, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 22nd day of March, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

CON. CALIFORNIA AND VIRGINIA MINING Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 8th day of December, 1896, an assessment (No. 7), of 25 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of January, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 4th day of February, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, California.

HALE & NORCROSS SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, State of Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 8th day of December, 1896, an assessment (No. 110) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 3, No. 331 Pine street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on MONDAY, the 11th day of January, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 1st day of February, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

R. U. COLLINS, Secretary.

Office—Room 3, Stock Exchange building, No. 331 Pine street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 14th day of October, 1896, an assessment (No. 4) of 5 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 567 Market street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of December, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 9th day of January, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—No. 567 Market street, San Francisco, California.

POSTPONEMENT.

The date of the delinquency of the above assessment is hereby postponed to the 22nd day of December, 1896, by order of the Board of Directors.

A. F. FREY, Secretary.

Room 44, Phelan building, San Francisco, California.

DELINQUENT SALE NOTICE.

GREENWOOD GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Greenwood, El Dorado county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the Sixteenth (16th) day of October, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Adams, Grove	7	11,000	220 00

And in accordance with law, and an order from the Board of Directors, made on the 16th day of October, 1896, so many shares of each parcel of such stock may be necessary, will be sold at public auction, at the office of the company, Room 79, Nevada Block, 309 Montgomery St., San Francisco, California, on MONDAY, the 14th day of December, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

CHAS. E. ELLIOTT, Secretary.

Office—Room 79, Nevada Block, 309 Montgomery St., San Francisco, California.

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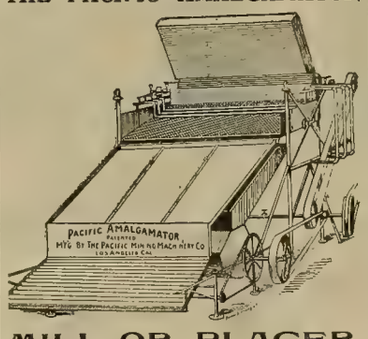

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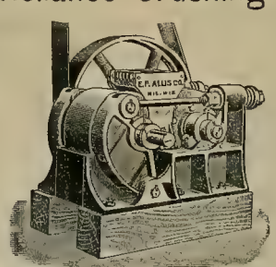

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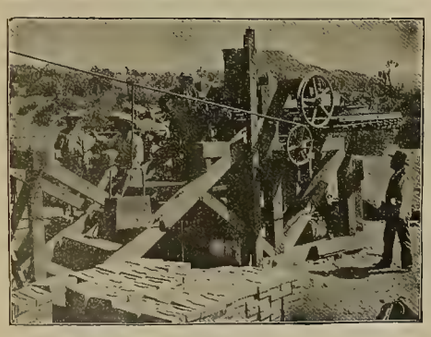

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AND PACIFIC ELECTRICAL REVIEW.

No. 1902.—VOLUME LXXIII. Number 25. SAN FRANCISCO, SATURDAY, DECEMBER 19, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

Copper Matting in California.

The only regular shippers of copper matte, obtained from their own ores, in California, are the Iron Mountain Mines, Limited, of Shasta county. Their property consists of a group of mines known as the Iron Mountain, which is connected by a narrow-gauge railway with their reduction works at Keswick, near the town of Redding.

The mine is a large mass of copper sulphides, carrying varying amounts of copper, silver and gold. Mining is readily done by adits and drifts, the ore being stoped in a simple manner devised by Mr. Alex. Hill, the manager, who has had extended experience with similar deposits in Spain.

The ore, with the exception of the outcrop or gossan, is a very heavy sulpbide with but little silica. It is extremely fusible, and, for that reason, very reluctant in parting with its sulphur. The gossan contains varying values of silver and gold, and was at one time worked in an amalgamation mill on a rather limited scale.

The two accompanying cuts represent respectively the roasting stalls and the blast furnaces of the Keswick Smelting Works. As will be noticed, the former is arranged in terraces upon a hillside chosen for that purpose. At the time this picture was taken, two single rows of fifty stalls each were in operation and a double row containing one hundred in course of construction. This plant, when finished, will be able to supply two blast furnaces. The more stalls that can be placed in one line, the less smoke will annoy the workmen. The gases are best taken off in the center of these rows by a flue leading to the chimney on top of the hill. The floor line of one row is four feet above the top of the one next below.

BLAST FURNACES BUILT BY H. A. KELLER, AT KESWICK, CAL.

The kilns are built of heavy masonry, preferably of stone or slag brick, and require no binders. If thus built, with dimensions of six feet depth, seven feet wide and fourteen long, they are capable of holding a 35-ton charge and admit of economical filling and discharging.

It is found most desirable to roast this ore from 47% down to a residual of 10% sulphur. To do this requires, approximately, one-fourth cord of wood for each filling and at least four weeks' time. Faster roasting than that is apt to cause running together of the ore.

The charging is done direct by train coming from the mine, and the discharging by a similar train delivering the product to the furnaces.

The second view shows the Smelting Works proper with two blast furnaces, the site and arrangement of which were selected by Mr. Herbert Lang; while the furnace, as well as the roasters, were designed and operated by Mr. H. A. Keller. These furnaces are 42x150 inches at the tuyeres, with a 6-inch bosh at the sides and a distance of 9 feet from center of tuyeres to charge floor. They are made simply of two sets of water jackets with a plate underneath. For each furnace a No. 7 positive blower has been provided, and with it the furnace has a capacity of, easily, 200 tons of sulphides in twenty-four hours.

The blowers are driven direct from a water wheel and discharge into a main pipe, which carries the blast to the furnaces for distribution.

STALL ROASTERS BUILT BY H A. KELLER, AT KESWICK, CAL.

THE fact that American mining engineers have become the vogue with British syndicates will indirectly lead to much good to this country. Following the lead of the Britons, the French and Russians have begun to call for the assistance of Americans in opening up mines. But what promises to be of far greater importance is the fact that there is an increasing demand from South America for mining engineers from this country, and especially from California. This will do much towards making closer connection between this country and the Republics of the South in other lines than in mining.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, December 19, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Blast Furnaces Built by H. A. Keller at Keswick, Cal.; Stall Roasters Built by H. A. Keller at Keswick, 497.
EDITORIAL.—Copper Matting in California; American Mining Engineers in Europe, 497. "Good Will" of a Business; Cripple Creek Lodes; Proposition to Consolidate Plumas and Sierra Counties; The Nomadic Prospector; The Mining Bureau and the State; Cripple Creek and the Comstock, 498.
SCIENTIFIC PROGRESS.—The Roentgen Ray Cure for Blindness; To Detect Foul Air; The Metre Not a Standard Measure, 502.
ELECTRICAL PROGRESS.—Copper Refining by Electricity, 502. A Large Electric Plant, 503.
MECHANICAL PROGRESS.—Metallic Carbides; Inaccurate Glass Gauge Readings; A Bridge Over the Hudson River; To Keep Brass from Tarnishing, 503.
PRACTICAL INFORMATION.—Nature as an Engineer; The Largest Canals; British and American Navies; Patent Law in Mexico; Lead Shot; Flags Hoisted at Signalling, 503.
MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 506–7.
THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 514.
MISCELLANEOUS.—Concentrates, 499. The Solution and Precipitation of the Cyanide of Gold; A Colorado Comparison Between Cripple Creek and the Comstock, 500. The Mineral Deposits of Eastern California; Canada's Best Known Mines, 501. Nevada City District Geology, 502. Coast Industrial Notes; Commercial Paragraphs; Recent California Mining Incorporations; Recently Declared Mining Dividends; Personal, 505. List of U. S. Patents for Pacific Coast Inventors; Notices of Recent Patents, 508.

The Mining Bureau and the State.

It behooves those interested in the State Mining Bureau to take some active steps immediately towards securing from the Legislature proper provision for its maintenance. Of all the industries, that of mining asks for and consequently obtains least from the State. No other publications from any State Bureau are in as great demand as those issued by the State Mineralogist and none do the State at large as much good.

With the present appropriations it is impossible for the assistants of the State Mineralogist to visit all portions of the State each year. A separation of the work of the bureau so that a geological survey may be undertaken independently as suggested by Mr. Crawford is necessary.

Most of the work of the Mining Bureau has been in connection with gold mining until lately, but within the past few years considerable attention has been paid to oil fields, deposits of coal, iron and other minerals. The State must be looked to for assistance in these directions or much effort will be lost in barren fields. It can only be to intelligent geological work that we can look for assistance in this direction.

The Nomadic Prospector.

The prospector on the Pacific coast has one great advantage over his brothers in most other mining regions. Like the birds he can change his habitat with the seasons and find congenial climates the year round. Hundreds of men who were in Alaska during the summer, and others who have been driven out of British Columbia and other parts of the northwest with the coming on of winter are now wandering over the deserts and mountains of the south from Tehachapi to New Mexico During the winter there will be no prospecting done in the north, but there promises to be greater activity than ever in the new fields in southern California, Arizona and New Mexico. Randsburg is attracting more attention than ever and outside of the district new finds are being reported.

It is probable that had the State of California good mining laws that would compel those who make locations to cease evading the intent of the Federal statutes, and do the required assessment work, much more development work would be done. As it is many of the first locators in the southern part of the State hold large numbers of claims and are not able to do even what the law requires. In many cases really good mines are located and finally abandoned because the locators do not develop them nor allow others to.

Cripple Creek and the Comstock.

No fair parallel can be drawn between the working of the mines of the Comstock in the early days of their history and those of Cripple Creek or any other mining camp opened within the past ten or fifteen years. In the article on page 500 of this issue taken from the Denver *Republican*, in the comparison of the cost of mining at Cripple Creek to-day and on the Comstock in the infancy of the silver mining industry in the United States, the almost innumerable adverse conditions required to be struggled with and overcome in the early days of Comstock mining are ignored. What was done at great cost, and often at great loss, on the Comstock in the early days is what now makes cheap working and good profits possible at Cripple Creek and at thousands of other mining camps in all parts of the world. Thus it will be seen that a parallel drawn between a mining camp of to-day in full possession of all the improved machinery and modern methods and processes and one in which everything was to be learned and discovered is rather invidious.

Besides, the wild and inhospitable character of the region in which the Comstock lode was situated should receive some consideration; also its remoteness from any adequate source of supply, the lack of any but the most primitive means of transportation and in places the entire absence of roads or even so much as a mule trail. At first all supplies were brought over the Sierras by mule trains and wagons and this continued nearly ten years before the Central Pacific railroad crossed the mountains. The cost of bringing heavy machinery and all the supplies required for thousands of people for every purpose from California was immense. Fuel and lumber were very dear and soon there was a great scarcity of water. To bring an adequate supply of water from the Sierra range cost $2,500,000. Then there were fires that swept the town and caused the loss of millions. The loss in the big fire of 1875 was over $10,000,000; the loss to the Bonanza mines alone was $1,461,000. Besides the fires on the surface in the towns there were several terrible fires in the lower levels of the mines.

When work first begun on the Comstock no one knew the depth to which the pay ore would extend, and all was mere conjecture in regard to what lay ahead. Thus it happened that heavier and heavier hoisting and pumping machinery became necessary, all the machinery first erected becoming useless. Also, in order to follow the dip of the lode to the east, it became necessary to sink new shafts, and always with more and more powerful pumps and hoisting apparatus. Not only were there great floods of cold water, but, presently, to the great surprise of the miners, there were inbursts of scalding hot water. The very rocks in which the men were obliged to work became burning hot in places. The great heat caused a demand for all kinds of "blowers" and ventilating apparatus. In short, almost endless difficulties were everywhere encountered and overcome, often after making many experiments and at great cost. The square timbers, alone, used in supporting the ground in the mines, cost millions, not to speak of lumber and fuel used on the surface.

In the early days the Comstock miners had neither air compressors, power drills nor high explosives. This made sinking and drifting slow work. A hundred labor-saving inventions now in use were then unknown. But improvements were constantly being made. The old world pumping machinery, hoisting machinery and ore-crushing machinery were overhauled and remodeled, besides which many new inventions in mining apparatus were made.

In the beginning American miners on the Pacific coast knew nothing about the extraction of silver from its ores; therefore, on the Comstock the methods of the Mexicans were at first used—the smelter, arrastra and the patio. These processes were found imperfect and too slow, and the same faults were developed when German processes were tried. Then was invented the American pan process, which immediately came into favor, owing to its rapidity, though far from being perfect at once, too many chemicals being used at first. All manner of crushing machinery and amalgamating apparatus were invented and tried, often at great cost. Then set in a rage for mills, and as early as the spring of 1862 there were over eighty mills in operation. Mills were put up on every canyon. Soon most of the money taken out of the first bonanzas had been put into all kinds of experimental mills and worthless amalgamating processes. Stockholders were responsible for much of this extravagance in the early days. They freely paid assessments and pushed mill building on mines without ore, as a means of raising the price of stocks in which they were speculating. Many lost sight of the mines and cared for nothing but mining shares. Men were often heard to say: "I don't want to hear how the mine is looking; the more I hear about it the less I know what move to make. What I want to know is what the stock is going to do." But all this was outside of mining operations, and had little to do with the real work in the lower levels.

As regards mines that failed to pay, no one could say until they were opened up that they were not as good as the best. The croppings all looked alike—some even more favorable than those of the Comstock—yet the lodes failed to pay. No camp has yet been found in which every lode contains a bonanza.

As to the great cost of operations on the Comstock, the same men that superintended the work on it in the early days—or any of the leading mining men of Montana, Utah or Colorado—could now take the lode, with all the modern improvements in use, and work it much more cheaply than was done. That is a proposition patent to everyone. It is a thing made possible by Comstock mining men and machinists.

It is to be hoped that Cripple Creek may produce $500,000,000. No one on this side of the continent would object. Even the best of the experts are unable to see a foot into the solid rock or to gauge possibilities. The greatest depth attained in Cripple Creek—850 feet—is a mere beginning, and at 3000 feet the mines may prove more comfortable than were the Comstock levels at half that depth. In fact, there was much less heat at a depth of 3000 feet in the Comstock than at several points above. There seemed nothing to prevent going to a depth of 5000 feet; but in 1882 a flow of water was tapped on the 2700 level of the Exchequer mine that flooded the Yellow Jacket and all the mines to the southwest, and they are still flooded, as the companies interested failed to agree in regard to the cost of pumping them out.

Such of the Cripple Creek lodes as are in contact with porphyry, phonolite and other dikes, and pass down through the volcanic breccia into the underlying granite without showing signs of weakening, are liable to prove paying to a great depth—perhaps as far as they can be followed. The small veins and fractures in the overlying lava-like material, however, are not likely to prove lasting. Their lease of life depends upon the thickness of the stratum of breccia through which they ramify. What the Cripple Creek miners will soon most want will be to find their veins safely launched on their way downward in the granite. Those who get into the granite may go on, but all others will stop.

A PROPOSITION has been made to consolidate Plumas and Sierra counties in order to reduce the rate of taxation, but it is not meeting with much favor. It has been pointed out that with the revival of the mining industry in those counties and consequent increase of value of property the rates will soon be largely decreased. In both Plumas and Sierra the total value of all property, according to the State Controller, has decreased slightly and the rates of taxation are somewhat higher, taking the figures of 1891 and 1895. However, in other mining counties a different story is told. Had either Plumas or Sierra as good communication with the outside world as those other counties the good effects of the revival of mining would have been felt sooner. There are no counties in the State in which greater increase in prosperity may be expected in the near future.

PRINTERS' INK, the best authority on advertising in the United States, refers to the analogy of the "good-will" of a business, and the cumulative effect of advertising. It says: "What is called the 'good-will' of a business is merely the cumulative effect of continuity. So with an advertisement; the longer it runs the greater its value. A business that has been continued for fifty years would lose its good-will in twelve months if once stopped, and very few men would care to pay much for it. Once advertising is stopped its cumulative effect is lost, and the longer it remains dead the harder it will be to make it effective when started again."

Concentrates.

LIKE Colorado, Nevada is now producing more gold than silver.

THE profits of the Silver Lake mine at Silverton, Colorado, for 1896 will approximate $800,000.

THE first through train from Spokane, Wash., to Rossland, B. C., went over the lines last week.

THE estimated population of the United States on the 1st inst. was 72,030,000; circulation per capita, $22.86.

A CONTRACT for running 600 feet of tunnel in the Morris Ravine mine in Butte county was carried out in 71 days.

D. C. CORBIN asserts his intention to build a smelter on the Spokane and Northern Railroad to work Trail Creek ores.

IN Santa Barbara county, near Serena, oil was lately discovered by running a tunnel in a deep gulch on the mountain side.

THE Southern Kootenay, B. C., shipments for 1896 amounted, up to the first of the month, to 27,200 tons, valued at $3,046,507.

FIRE devastated Jamestown, Tuolumne county, Cal., last Thursday. The town is four miles from Sonora and is known far and wide as "Jimtown."

AT Island Mountain, Idaho, a company that controls 10,000 acres of gravel has a force of 350 men building a reservoir and doing other equipment work.

THE Montana legislature will be called upon this winter to make several new counties in that State as a result of the development of new mining districts.

THE American Zinc-Lead Company of Canyon City, Colorado, are shipping twenty tons of copper ore daily from the Holland mine at Washington camp, Arizona.

THE Le Roi mine, in Trail Creek, B. C., is 500 feet deep and has paid $250,000 in dividends. The output is 150 tons a day, but this is to be increased to 300 tons.

MINE BELL SIGNALS, adopted, used and in force in accordance with all the legal requirements of the law on that subject, are furnished, printed on cloth, at this office.

THE State Supreme Court decides that the act providing that mining superintendents of California must make a weekly report to the stockholders is constitutional.

RESIDENTS of Los Angeles and San Bernardino counties are petitioning Congress to open the San Bernardino and San Gabriel Government reservations to mining locations.

THE Ashford Mining Company has been incorporated for $200,000, to work the King Solomon, Hector, Desert Queen, Kootenai and Magpie mines in the Randsburg, Cal., district.

THE Pedro Prieto property in Santa Eulalia district, Chihuahua, has been sold to the Mexican Ore Company who propose to develop it in an extensive scale and employ over 1000 men.

THE report of the State Mine Inspector of South Dakota will show that the output for 1896 from the Blacks Hills will exceed $7,000,000, of which $3,000,000 is from the Homestake properties. The product of the Black Hills for 1895 was less than $3,500,000.

THE largest orders anywhere in this country now given machinery manufacturers are from miners. The biggest enterprises now being started or in process of inception are mining propositions.

THE Southern Pacific Railroad Company last week filed a patent in the clerk's office of Siskiyou county, Cal., to 199,772.35 acres of land, some of which lies in that county and some in Jackson county, Oregon.

THE several newspapers published in the mining sections of this and other States are doing good work for the development of their respective localities, which should be recognized and encouraged by their constituents.

INCLEMENT weather in other localities is sending a large number of miners and prospectors to the "desert mines" in southeastern California, and whatever is there will be thoroughly exploited and explored this season.

THE Catron land bill has been defeated in Congress. This bill sought to allow aliens to acquire title to real property in the Territories under mortgage foreclosure, but provided that they must dispose of such within ten years.

THE Northwest Australia Goldfields Ltd. claim that they have been discovering diamonds among their auriferous conglomerates in the Nugalline district while working for gold. These conglomerates are similar to those of South Africa.

THE Champion mine at Grass Valley, Cal., has been offered to the Exploration Company of London, through Bratnober, and has for several weeks been under examination by Wartenweiler and Browne. It is probable that a sale will be made.

ARIZONA has a mining law which will not allow the relocating of claims to avoid assessment work. It compels the locators to do development work. Such a law is a necessity in California and it is to be hoped that it will pass the next Legislature.

A COMPANY has been organized in Glasgow, Scotland, under the name of the Meldrum Tunnel and Mining Syndicate, to run a tunnel 22,400 feet in length from near Ironton to the Telluride side of the mountain in Colorado. The cost is estimated at $2,000,000.

AT the Centennial-Eureka, Tintic, Utah, which has paid over $2,000,000 in dividends, they are working 1500 feet below the level of the surface and hoisting from that point ores that show from one to three ounces gold in addition to silver that frequently runs over 100 ounces.

THE Gold Creek Mining Company, north of Elko, Nev., is engaged in a very large gravel enterprise. They have 5000 acres of land and claim that a large part of it will yield 60 cents per cubic yard. From the large reservoirs they are building there will be a fall to a central ditch sufficient for 1000 H. P.

ON Lookout mountain, B. C., on one the claims of the Kohinoor group a tunnel that must have been run many years ago has been found. It has the appearance of having been made by the Hudson Bay Company when it occupied Fort Sheppard, the abandoned site of which is on the banks of the Columbia not far away.

THE War Eagle Mining Company of Rossland, B. C., has sued Charles T. Long, correspondent of the London *Standard*, for $10,000 for libel. This action arose out of the publication by the Victoria *Colonist* of a letter signed by Long, which intimated that the War Eagle management had been robbing the Poorman Fraction to swell its shipments and consequent dividends. The *Colonist* has since made a public retraction of the statements in that letter, alleging that it did not know to whom it referred.

THE antimony mines near Thompson Falls, Montana, have been leased to an Indiana man. It is claimed that these properties contain large deposits of antimony. Experiments have been going on for several years, and it is now claimed that a process has been found whereby the ore can be profitably worked.

THE Pandora Tunnel Company has been incorporated in Colorado, to run a 9x10-foot tunnel 6000 feet long at Telluride. It will run through the Marshall Basin and tap the Tomboy, Belmont, Japan-Climax, Flora, Occidental, Whale, Patrick Henry and Pandora. D. H. Moffatt and other capitalists are the incorporators.

PATRICK REDDY of this city last week obtained from his partners in the Randsburg company a bond on their interests at $150,000, half payable in 70 days and half in 100 days. Sixteen mines are involved in the deal, including the Olympus, which is regarded as the leading mine so far as developed in the Randsburg district.

THE Anaconda Company will make a better showing than ever in its history this year. Its output of copper has been materially increased since August and for the first ten months of this year the production of copper exceeds that of the whole of 1895 by 4,000,000 pounds. The output for the year will approximate 130,000,000 pounds.

THE Mount Bischoff, Australia, mine is probably the present largest single producer of tin in the world. Last year it yielded 2281 tons block tin. During the same period Bolivia exported to England from its mines 4,097 metric tons of tin. The Bolivian ore is the richest of which we have any knowledge, some of it carrying 65% metal.

FROM the water of the Anaconda and St. Lawrence mines, in Montana, one Ledford made, it is claimed, $60,000 in two years by precipitating the copper. His methods were crude and since the company took the concession from him they have put in an improved plant and will net from the water from all their mines $15,000 a month, it is said.

PERHAPS nothing better illustrates the need for immediate revision and amendment of the mining laws of California than the multitude of letters weekly received from miners all over the State making inquiry as to points of vital interest to them, but which are so contradictory and conflicting in law and court decisions as to perplex everyone.

TO SHOW that the camp is not boomed out of reason, the Rossland, B. C., *Miner* states that the population is over 6000. The number of miners at work for wages is 1300. In addition to the miners, there are 500 wood choppers and teamsters employed. Three sawmills furnish employment to 200 hands, and the railroads give permanent work to 200 more.

THE ancient Pegleg which has been discovered so often is still being sought for. At last accounts it was over the line in Mexico. According to the Arizona *Kicker* a deputy United States marshal knows where it is and has gone after it. It is to be hoped that he is supplied with proper extradition papers. This country cannot afford to lose the Pegleg.

LAST WEEK masked men took Capt. Meikle, the superintendent of the Garnett Consolidated Mining Company in Plumas county, from his house, mounted him on a horse and ordered him to leave. The next night a large number of men raided the cabins of the Chinese employed by Meikle's company and escorted them to Gibsonville and told them they would not be allowed to work in the mines.

THE list of California mines, miners, location of mine, post office address of owner and superintendent, etc., recently published in this paper, is being rehashed and republished in two or three quarters and used to coax money from "advertisers." It is probably unnecessary to say that this paper has nothing to do with such schemes. The information was originally published herein, and a complete list can be sent to anyone upon application.

ESTIMATES of the total cost of prospecting, locating, developing and working all the mines of Cripple Creek up to the present time show that not more than 50 cents have been expended for every dollar taken out. This is probably the best record ever made by any large camp, particularly where there is taken into consideration the fact that much of the money spent will be returned many fold from mines that have been proven of value, but as yet have not been worked much.

THE supervising special agent of the Treasury Department in his annual report opposes the erection of sampling works at Northport, Wash., and Bonners Ferry, Idaho. He says that the erection and operating of such sampling works will necessitate the expenditure of a large sum of money, and suggests instead that the ore be allowed to go forward to properly equipped smelting establishments, where a competent officer of the Government would ascertain the amount of the duty.

JUDGE BAKER, at Phœnix, Arizona, recently made a mining decision that will probably stand till overruled. In August, '94, L. P. Nash located the Overlook mine, put up one monument and his location notice, and no more. Sixty days subsequent he returned to complete his location and found L. J. Horton et al. in possession and brandishing shotguns. Nash brought suit, but the Judge decided that he "was guilty of unreasonable delay," and that defendants were entitled to the mining claim.

"WHAT," asks a Mariposa, Cal., subscriber, "is required to hold possession of a mill site?" In the case of Hartman vs. Smith, 7 Montana 19, the Court held that "all that is necessary to make the claim of a mill site by the owner of a noncontiguous mining claim valid is the reasonable use and occupation thereof for mining purposes in connection with a mining claim. A mill site may be patented by compliance with the same requirements regarding survey and notice as are applicable to veins or lodes."

ALTHOUGH the production of copper has been pushed, the world's supply in stock is continually decreasing. The total on hand at Dec. 1st of each year from 1891 to 1894 inclusive was about 55,000 tons. In 1895 it was 42,481 and for the past three months it has been about 30,000 tons. American exports to Europe for 1896 were 112,736 tons against 57,595 for the same period last year. The large increase in consumption of copper will be the cause of developing the many new discoveries made, particularly on the Pacific coast.

THERE is a similarity about the mining development work being done in Colorado and California that will be disappointing to many who do not look beneath the surface. The increase of this year's yield over that of last year in both States will be very small compared with the increased activity. The reason for this is that a very large proportion of the mines being developed, while proved to be valuable, will not begin producing in time to affect the total yield. It is probable, however, that the yield of 1897 in both States will far exceed that of 1896.

SOME good records in running tunnels are being made. In the big tunnel at Cripple Creek, being run to tap the mines, nearly 12 feet per day is being made. The Butterfield tunnel in Utah was run at the rate of 11.2 feet per day. The total length, 8280 feet, was run at the rate of 9.1 feet per day. In the Sioux-Ajax tunnel at Tintic, Utah, which is 9x10 feet, a daily rate of 9.2 feet per day was made with two shifts of eight hours each; but for short allowance of air for the drills three shifts could have been run and an average of 13.8 feet might have been estalished.

A CORRESPONDENT of the Redding *Free Press* claims that the arsenious and sulphuric acid fumes from the smelters of the Iron Mountain mines at Keswick will ruin vegetation in the neighborhood. He says that the present amount of ore treated is 450 tons a day and that this will soon be increased to 1000 tons, from which 250 tons of sulphur and arsenic will daily settle down on the surrounding country until nothing can survive its deadly effect for a distance of fifteen miles or more. He suggests that condensers be put in to protect the public from the effects of this. The matter is probably exaggerated.

THE Exploration Company of London, through Hamilton Smith, have purchased 50 per cent of the stock of the Helena & Frisco mine, in the Cœur d'Alene country, Idaho, at the rate of $900,000 for the whole property. The mine, although it has had to erect three mills, has paid $500,000 in dividends. The first mill was blown up during the great strikes and the second was a failure and had to be torn down. The mine is a silver producer and employs 250 men. The Exploration Company last week also finally concluded to accept the reports of the experts on the Tomboy at Telluride, Col., and closed the deal for the purchase of that property.

THERE has been issued by the State Mining Bureau, in pamphlet form, that part of the forthcoming annual report that deals with the resources of Trinity county. Mr. Crawford has suggested that similar publications be made as to the other leading mining counties of the State, and it is to be hoped that provision will be made for carrying it out. The main product of Trinity county is gold from its immense placer deposits; but of late there have been very important developments of quartz, that give promise of making it one of the first counties in that direction. The other mineral products found in Trinity are quicksilver, copper, coal, granite, marble and platinum.

THERE is a great difference between the manner in which the European, the Eastern and the local capitalist invests in California mines. The Boston man and most of those from the Eastern States look for paying properties. He wants a sure thing and does not care to prospect or develop. The European, particularly the English investor, will take hold of big partially developed properties that promise well and spend money liberally to open them up. However, he wants big things and will pay well for them. The Californian prefers prospects for which he will have to pay little until he proves up the property. He does more in the way of opening up of new mines and new districts than the others. The Californian who has money to invest is more apt to put it in the newer districts than into the older camps.

CHARLES BUTTERS on his return from South Africa in an interview in New York gave out the idea that the Transvaal government is awakening to the idea that its "dog in the manger" policy is not what will be for their own good. He said: "The Transvaal government is now settling down to assist the mining interests in every possible way. The government feels that absolutely essential. A large amount of capital that has been there is going to Australia or New Zealand or else coming to this country. Many capitalists think that less attention has been paid to the gold resources of the United States than should be the case. Foreign, as well as American capitalists, are now turning their attention to this country and are sending engineers directly into the field, so that the slump in values in the Transvaal is really a benefit to other gold producing countries."

IN speaking of the recent decision on the right of placer claimants by Land Commissioner Lamoreux, Senator Teller of Colorado says that the former rulings of the Land Office, which have been apparently reversed by this latest decision, have been in existence for the past half century, and, while he has not had an opportunity of examining the case, he could not see any special reason for the position taken by Lamoreux. "I have no doubt," says he, "if the bill proposed by the California miners comes before Congress—to put the practice of the Department into the form of statutory law—it will be passed, unless the Secretary of the Interior should reverse the decision of his subordinates. It has always been customary to put sulphur, borax, kaolin and like minerals not in place under the provisions of the laws governing placer claims, and I fail to see any reason why they should not be still maintained in that category. The bill will certainly receive attention if it comes before Congress." Lamoreux's decision was in favor of the Northern Pacific Railroad Company and against a placer claimant.

J. C. F. JOHNSON of Adelaide, Australia, at a recent scientific meeting there, exhibited specimens of non-gold-bearing rock, in which he had artificially introduced gold in the interstices and on the face "in such a manner as to defy detection, even by skilled experts. Some of these specimens were shown privately to several distinguished geologists, who expressed great surprise at the remarkable character of the exhibition." The discovery, some years ago, that gold could be induced to deposit from its mineral salt to the metallic state on any suitable base, such as iron sulphide, led Mr. Johnson to experiment with various salts of gold, and by which he has produced most natural looking specimens of auriferous quartz from rock which, from previous assay, contained no trace of gold. Moreover, the gold which penetrates the stone in such a thorough manner assumes some of the more natural forms. In one specimen shown, the gold not only appears on the surface, but penetrates each of the laminations, as was proved by breaking. While this knowledge of how gold was probably deposited may help to suggest how it may be economically extracted, the thought also occurs what a power of harm it would be in unscrupulous hands for the fraudulent "salting" of mines.

The Solution and Precipitation of the Cyanide of Gold.*

By S. B. CHRISTY, Professor of Mining and Metallurgy, University of California, Berkeley, Cal.

The fact that many millions of gold have been extracted by the cyanide process during the last five or six years from South African tailings which could not be profitably worked by any other method previously tried upon them, lends a peculiar practical interest to this branch of metallurgy.

Numerous writers have recently made valuable contributions on the process without exhausting the many complexities of the subject. Among the first American writers on the subject in its modern aspect were two former students of the University of California, Mr. Louis Janin Jr. and Mr. Charles Butters. Young Janin was one of the first to enter this field, and performed much useful experimental work in the early stages of the history of the process.

At about the same time Mr. Charles Butters, who had left California to erect chlorination works for the Robinson mine at Johannesburg, became interested in the cyanide process, and, after getting the chlorination plant in working order, erected, for working the tailings from the Robinson mine, a cyanide plant which achieved the first large-scale success ever made with this process.

The papers which Charles Butters, together with John E. Clennell and Edgar Smart, have contributed on the chemistry of the process, were among the first to give any adequate idea of its nature.

Another important contribution to the literature of the subject is the paper of Dr. A. Scheidell, published in 1893 as a "Bulletin of the California State Mining Bureau." This contains an admirable summary of the state of the art at the time of its publication.

Many notable contributions have been made by others, some of which will be referred to in what follows, as called for by the context.

The rapid extension of this process in South Africa s evidenced by the value of the cyanide product for the Witwatersrand district. In 1890 it was less than $6000; in 1891 it had grown to over $60,000; in 1892 to over $3,000,000; in 1893 to over $6,000,000; and it is still increasing.

Although, several years before 1891, I had obtained some very promising extractions from gold ores by the use of cyanide of potassium solutions, I was prevented until that year, by the constant pressure of other duties, from any systematic study of the subject. In the experimental work then commenced I was aided by several of my students, more especially by Mr. Thomas E. Eichbaum, who at the time of his death, a couple of years later, was chemist for Mr. Almarin Paul at his cyanide works in Shasta county, Cal.; Mr. C. W. Merrill, who has since erected cyanide plants at Bodie, Cal., and at Harquahala, Arizona; Mr. Leslie Simpson, now in South Africa; Mr. H. C. Baldwin, now in Mexico, and Mr. F. Booth, now in Alaska.

The result of these studies, made on a large variety of ores, was to show in all cases a partial extraction of gold. This extraction varied from 20 per cent to 95 per cent. While it was always easy to make a partial extraction of the gold, it proved difficult, in many cases impossible, to get anything like a complete extraction. Another difficulty encountered in these experiments was that very dissimilar results were often obtained with ores of almost exactly the same composition.

A careful study of all this preliminary work soon convinced me that two equally important classes of causes were active in bringing about these variations in the result: the one of a chemical, the other of a mechanical nature. It was equally clear that it was expedient to make a separate study of these two sets of causes; and as it was, of course, impossible to separate them in the treatment of samples of ores, a systematic investigation was laid out, involving the use of simple artificial products of known composition, so as to determine the various complicated elements of the problem.

In the long, involved and difficult investigation which followed, and which has occupied all my leisure time since 1892, I have been greatly aided by my assistant, Mr. E. A. Hersam, for whose intelligent skill and faithful devotion to the work I wish to express my warm appreciation.

The great complexity of the chemistry of the cyanides, the lack of accurate information in the text books, and the consequent erroneous statements in many of the publications on the cyanide process, have greatly added to the difficulties of the study. It became necessary to test *de novo* almost every step of the ground, so that an investigation which I had hoped to finish in a couple of years has already taken twice that time, and is now only fairly begun. Nevertheless, some of the results already obtained are so important that I have decided to condense in this paper an outline of many closely written pages of experimental notes on this subject. I hope to find time hereafter for a complete outline of the details.

In this discussion I propose to confine myself to two main points: How does gold dissolve in cyanide solutions? and, How is it precipitated from them?

I.—THE SOLUTION OF GOLD IN CYANIDE SOLUTIONS.

1. *The Solution of Metallic Gold in Potassium Cyanide.*

The solubility of gold in cyanide of potassium solutions has been known for over fifty years. Soon after its discovery by Elkington, Faraday and Bagration it was investigated by Ellsner,† who stated that he had found that while zinc would dissolve in a potassium cyanide solution with the evolution of hydrogen, gold and silver dissolved in such a solution only in the presence of oxygen. Although not enunciated by him in this form, the following reaction expressing these facts is usually known as the Ellsner reaction:

$$4KCy+2Au+O+H_2O=2AuKCy_2+2KHO.$$

The necessity for the presence of oxygen when gold dissolves in cyanide solution has been denied by Mr. J. S. MacArthur, who claims the honor of the invention of the cyanide process. In his article on "The MacArthur-Forrest Process of Gold Extraction," read before the Society of Chemical Industry, March 31, 1890, and reprinted a .d circulated by the "Gold and Silver Extraction Company of America," Mr. MacArthur says:

"Not having seen the original account of Ellsner's researches, I am not in a position to criticize his experiments, but I never could find that the presence of oxygen was necessary either to dissolve gold by itself or from ores by cyanide."

He cites no proof of his opinion regarding the action on metallic gold, but confines himself to speculation, as follows:

"If a piece of gold be immersed in a cyanide solution, so that air, to act on it, would have to penetrate two or three inches of the solution, the gold will dissolve in its usually slow and steady fashion. The equation shows that either oxygen must be absorbed or hydrogen evolved. I have seen no evidence of the former, and can adduce no proof of the latter; but I think the latter more probable, because I cannot conceive oxygen penetrating even a film of cyanide solution without oxidizing the cyanide to cyanate, whereas, in the other case, as suggested to me by my friend, Mr. Ellis, the nascent hydrogen may be at once seized by the excess of cyanide present and ammoniacal compounds formed."

Unfortunately for this ingenious speculation, it does not seem to be borne out by the facts. McLaurin‡ has shown by a very able research:

(1) That oxygen is necessary for the solution of gold in potassium cyanide solutions, and that it combines, quantitatively, according to Ellsner's reaction.

(2) That the rate of the solubility of gold in potassium cyanide solutions passes through a maximum in passing from concentrated to dilute solutions.

(3) That this remarkable variation is explained by the fact, which he also proves, that the solubility of oxygen in cyanide solutions decreases with the concentration of the latter.

But, to continue with our quotation from Mr. MacArthur, he says:

"However, we do not concern ourselves with the reactions of pure gold; but, as a matter of fact, we cannot find that oxygen plays any part in the cyanide extraction of gold from ores. We have treated an ore with cyanide with free access of air, and then a parallel experiment was done with boiled water, the bottle filled to the stopper with the solution and ore and the stopper sealed. The extraction was the same in both cases."

It will be seen that nothing is said as to the composition of the ore, so that the experiment is not decisive.

While McLaurin's experiments seemed conclusive, still the difference of opinion between Ellsner and McLaurin on the one hand, and the reputed discoverer of the cyanide process on the other, was so fundamental that it seemed worthy of further investigation. The importance of this fundamental reaction is not merely scientific, it is of the greatest practical importance in the application of the process.

Hence, this was one of the first points to which I turned my attention. The result of my investigation was an entire confirmation of the accuracy of the Ellsner reaction. That is, repeated experiments indicated that a solution of pure cyanide of potassium in pure water, from which all other substances are excluded, is entirely without action on metallic gold. Under favorable circumstances, such a solution absorbs oxygen from the air (without, as MacArthur assumed, immediately oxidizing the cyanide to cyanate), and the affinity of the potassium for oxygen and water, combined with the affinity of the cyanogen for gold and cyanide of potassium, leads to the formation of caustic potash and potassium aurocyanide, as per Ellsner's reaction. When the air present is limited, the reaction stops when the oxygen of the air is exhausted, and begins again when it is supplied.

*olorado meeting American Institute of Mining Engineers, Sept., (Revised Proofs Dec. '96.)

†J. f. Prakt. Chemie, xxxvii, p. 441, year 1846.

‡Jour. Chem. Soc. May, 1893.

(*To be Continued.*)

A Colorado Comparison Between Cripple Creek and the Comstock.

Looking backward it is hard to realize that the Comstock, that great silver lode of Nevada that in twenty-one years of operation produced between the surface and the great depth of 3300 feet more than $300,000,000, could have at any time in its history been looked upon with suspicion; or that, until the end of its bonanza career, when the ingenuity of man failed to mine it any deeper, any doubt should have been entertained over its future. When the mining man and the investor speak of the unequaled record of that great lode they forget that, through a season lasting eight years, there were few of the first class to raise a voice in defense of the worked-out mines, or fewer still of the investing class to take advantage of the season of depression and prepare for the greater fortune that followed the hard-luck season on the big lode.

The few of each class who stood by the Comstock in its season of depression, kept faith in its future greatness and backed that faith with money and labor, are the men whose names are now erroneously associated in the public mind with the discovery and location of the lode. The investor class is represented by William Sharon and his associates in the Bank of California; the mining class by Mackay, Fair, Flood and O'Brien. These men, whose enormous fortunes are credited to them by the public as a good stroke of luck, are the ones who came to the relief of the Comstock in its days of adversity.

When the original companies that became possessed of the Comstock from the locators and mined it for the first five years following began to go to smash as the result of extravagant management, the Bank of California was on hand to loan money on the properties and mills and buy them in when the surface pockets were exhausted and the companies forced to the wall. Previous to the arrival of Sharon in Virginia City, the Comstock boom had cost the public many millions of dollars lost in the purchase of shares in mining companies that never paid a dividend. The history of mining holds no record to parallel the extravagant follies of the period between 1859 and 1864—the first flush days of the Nevada bonanza. Ten mines that never paid a dividend cost more than $17,000,000 to exploit, and the total selling price of the lode was at one time above $700,000,000. Ten companies expended more than $17,000,000 in exploiting Comstock territory without returning a dollar, and shares of such companies were selling at enormous prices, while assessments were being levied regularly.

The cash ledger of the Comstock shows the total production during its twenty-one years to have been $306,000,000, its dividends and profits $118,000,000, with the assessments of its several companies aggregating the enormous sum of $62,000,000. They are immense figures, to be sure, but the actual profit of $56,000,000 does not appear so favorable as it might be against the total cost of $250,000,000.

The average annual yield of the Comstock during its first twelve years, or from 1859 to 1871, was but $12,000,000, or a total of $145,000,000; but the fluctuation was from $18,000,000 in prosperous times to as low as $2,000,000 a year when the lode was at its worst stage, then up again to $25,000,000 a year. Had the Comstock been deserted to its fate at the close of 1871 it would have left a heavy account with the public unsettled. Mackay and Fair, hard-working miners, backed by Flood and O'Brien, turned the tide in the Comstock's fortunes in 1872, when they opened up the big bonanza pocket in the Consolidated Virginia that produced in all about $105,000,000 and paid dividends of about $75,000,000.

And to find this pocket of ore they sunk a shaft 1167 feet in barren ground; to mine it they sunk below 3000 feet in depth.

These figures are of interest at this time, because Colorado has a mining camp that has had in some ways a parallel history to that of the Comstock, and because one conservative mining man has predicted that in a period of time corresponding with the life of the Comstock, Cripple Creek will produce $500,000,000 in gold.

Cripple Creek awakened a new interest in mining stock speculation and has had an era not similar to that of the San Francisco Stock Exchange in the early '60s, but compared to it on about the scale of a 40-cent Cripple Creek stock compared with a Comstock one selling at $1525 a share. But with the difference that there has never been a greater shrinkage than 50 per cent in a Cripple Creek stock, while it was not unusual for Comstock shares to fall from $1525 to $1.50 in a season. If the public will speculate, it must expect stocks to rise and fall; but Cripple Creek stocks offer no such speculation as did these assessment shares of non-dividend companies on the Comstock. There have been advances in Cripple Creeks as great as from 8 cents to $2 almost in a year, but no backward movements at even such rates as this. When a Cripple Creek stock gets to $2, there is reason for it being there and it usually camps about that figure unless some untoward accident in the property permits the skillful broker to get a temporary advantage of the market and force

it down to $1 25. Evidently the public has learned more about the mining business and the stock exchange than it did in Comstock days, but it is a question if the right attitude is not to be found between the over-enthusiasm of that era and the over-conservatism of the present day.

The Comstock cost too much. The world paid too dearly for what it got. Cripple Creek, with its cost of $7,000,000, against its credit of $23,000,000, makes much the better showing and has been a better investment. Its $23,000,000 production looks meager beside the $396,000,000 of the Comstock, but it is five years against twenty-one, and the Comstock's really bonanza days only commenced when it was thirteen years old. The Comstock had uncounted millions to assist in its development. There must have been "money to burn," since it is stated the Ophir had taken out $15,000,000 and only paid $1,400,000 in dividends. Only the most reckless disregard for money could have resulted in such a showing, and it would be interesting to know what in this day of mining would be done to the directors of a Cripple Creek company that did not pay out as dividends at least half the receipts from ore. Cripple Creek has had to pay its own way and in most cases profits at the time the mine was in the development stage. The 1167-shaft on the Consolidated Virginia, with the attendant dead work done to hunt for ore, cost $212,000 and was raised by assessments on the stock. The men who paid the assessments are the men who are now thought of when the "Big Four" mining kings of America are mentioned. It is when the search for a parallel with this kind of thing in Cripple Creek is commenced the difference between the two camps becomes so great there is no parallel at all. On the Comstock the Overman Company alone expended $3,162,800, levied from stockholders on assessments. In Cripple Creek work usually stops and the workers turn tail if as much as $1000 has been expended without results. A very few tunnel enterprises contemplating the expenditure of from $50,000 to $100,000 have been started, and there is one shaft, the Granite, that cost probably $25,000 before it began to produce at 600 feet. The Dead Pine has been another case of assessments without returns until its debit was well into the thousands, and about $15,000 was expended on the Gold Coin before it began to pay, but these few instances only emphasize the difference.

No bonanza chute to compare with the one that made the fortunes of the Big Four has yet been opened in Cripple Creek, neither is there a shaft 1167 feet deep. There are chutes here that have been followed from the surface down 600 feet into the ground, and that run so many hundred feet on the vein and so many feet wide, and produce ore worth so many dollars a ton, that if the facts were given in feet and ounces there would be a newspaper correspondent shut out from further following their fortunes; and there is one such chute that has made several men millionaires and others that have made many other men independently rich, and all that in two or three years, against the twenty-one years of the Comstock.

It may seem ridiculous to the public to offer a comparison between the Comstock of silver and the Cripple Creek of gold. The public takes note of nothing but records, and with the $306,000,000 and the twenty-one-year record of the one it is easy to laugh at the $23,000,000 and five-year record of the other. It is for the public to look backward, but the individual who sees ahead is the one the public look back upon with admiration in later years. And who shall say that sixteen years from now there will not be such individuals to be called the lucky dogs of Cripple Creek?

In every way Cripple Creek has stood the test that allows the comparison to be made. Its ore bodies are more diversified; where the Comstock had one lode Cripple Creek has thousands of veins, and where the Comstock had its rich pockets and great bonanzas reaching down to 3300 feet Cripple Creek has its hundreds of ore chutes that have improved steadily down to the deepest point they have been mined, and the disclosures along that present mining level, which is about the water line, have been so surprising in every case that the miner knows not what riches to expect when the season of pump installing and preparation forced by the new condition brought by the water shall have come to an end and the shafts gone as far below the water line as they now are above. If man could mine the Comstock to 3300 feet in the face of heavy solfataric action that raised the temperature in the lower levels to 114°, and all the enormous expense of pumping air into them could not reduce the heat below that, it will surely be possible to go yet deeper in Cripple Creek, where no such action interferes.

That the time will come when the Cripple Creek shafts will go to even greater depths in search of ore seems reasonable to expect. Every fear advanced by the mining experts has been removed, and every objection against the ores continuing to the farthest depths disproven by the actual development. The veins have persistently improved, passed through the overlying cap of eruptive rock down into the granite and the ore chutes solidified, enlarged and increased in value with each change encountered. The water level but enriched the ores and failed to bring the promised alteration to base and refractory sulphides of low grade. Once the knowing ones talked of surface deposits and "catch-as-catch-can" veins, but they have been rebuked by the proof of the developments. The ore deposits have withstood every test, and each year added a few millions over the output of the one preceding.

With the shafts now in water going down steadily into richer and yet richer ore, and in wider and yet wider bodies, and with the surface workers finding day by day new places to start new shafts, with more than 200 shafts already under production and more coming in as fast as men can find money to work with and secure ground to work in, with the greatest depth in the district 850 feet and but five shafts over 700 feet, every one of these exemplifying the same law of improvement with depth and richer ore below the water line, the mining man who has ambitions to be known as a prophet among his kind will at least take the safe side by granting the possibility of Cripple Creek in time equaling the ever world-famed silver bonanza of Nevada.

In Comstock days the mining world went mad, lured by the rapidity with which men made fortunes, then mad again over the rapidity with which fortunes were lost. Probably the mistake is in calling that wild furore of speculation business at all. In these days, at Cripple Creek, mining is the most conservative business, and few will risk more than a few thousand dollars in the venture for a fortune. It is only in this that Cripple Creek becomes the antithesis of the Comstock—in the business handling and in the contents of the ore. It was the Comstock's silver riches that set Colorado miners hunting for silver, and in its reflected light it was forgotten that gold could be mined to a profit. Now it becomes Cripple Creek's part to reverse the reflection and prove that gold mining in Colorado is equally as profitable by becoming the golden Comstock of the mining world.—Denver Republican.

On page 498 will be found some editorial comment on the above.

The Mineral Deposits of Eastern California.

NUMBER II.—*Concluded.*

Written by HAROLD W. FAIRBANKS.

The silver-lead mines of Cerro Gordo, situated near the summit of the Inyo range, have produced several million dollars. The Union mine was opened to a depth of 900 feet, when the ore body was lost. The inclosing rock is limestone of Carboniferous age. Bunches of very rich gold ore were occasionally found in this mine. Quartz occurs in some of the deposits about Cerro Gordo. When this gangue is present the lead content is less important, being replaced by iron and copper sulphides.

Silver-Bearing Sulphides of Copper, Antimony and Arsenic.—These minerals are found in well-defined veins, seemingly without regard to the character of the formation. Over much of the area in question they are frequently associated with gold-bearing quartz veins, the value of the contained gold sometimes equalling or exceeding that of the silver.

Pyritiferous Mineralization of the Rocks of Eastern California.—A most striking feature of this region is the wide distribution of iron pyrites, its presence being recognized at a distance of many miles by the red stains on the rock faces of the mountains.

No detailed study has been given to the question of the origin of the iron pyrites. To the writer it seems that it must be of secondary origin and that it is related to the widely disseminated deposits of the precious metals. Its presence in the ancient acid eruptives, as well as in the most of the varieties of the sedimentary rocks, would seem opposed to the view of its primary nature. On the contrary, its distribution through large areas of massive rocks, as well as the fact that in its distribution it generally seems to be independent of known ore bodies, is rather difficult of explanation on the view of secondary origin.

Discussion and General Conclusions.—(*a*) *Gold Ores.* A description of the gold quartz veins of California has recently been given by Mr. Lindgren. The writer agrees with most of the conclusions reached in that paper, but in some respects they do not all apply to eastern California. For example, he states that "the gold quartz veins throughout the State of California are closely connected in extent with the above described metamorphic series and that the large granite areas are almost void of veins, though fissures and fractures are not absent from them." The granite areas of the region described contain the greater number of the gold-bearing quartz veins, and they are by no means insignificant in number or value. Lindgren also says: "It appears to be a fact that veins in grano-diorite contain more sulphurets than those in other rocks." This is fully borne out by the writer's observations. A statement of general application can be made to the effect that the veins in the granite contain but little free gold below a certain depth, dependent upon local conditions, where it is replaced by auriferous iron pyrites. The veins in other rocks often contain free gold. That the veins in all the different formations are of fissure origin is unquestionable; they are not segregated, nor in any case does the ore seem to have been leached from the walls. There can be no question also, at least as far as the gold ores are concerned, that the mineralogical character of the country rock is of no great importance, the influence exerted being more often dependent upon physical conditions. It is a fact of general application that certain districts in eastern California are characterized by gold, others by silver, without any marked dependence, except in the case of galena, on the character of the rocks in those districts—that is, gold and silver deposits do not generally occur indiscriminately side by side. This would imply a much greater dependence on the nature of the chemical action than upon the physical conditions existing or the precipitating power of the walls upon the mineral-bearing solutions.

A number of the gold mines in the granite have reached a depth of 700 feet without becoming poorer, while those of Bodie have been opened to 1200 feet. It is only in the latter that the veins have been found to give out, becoming weaker below the 500-foot level.

The occurrence of gold in galena is rather remarkable, as well as that of its dissemination in the granite northeast of Mojave.

It is probable that the gold deposits of eastern California, with the exception of Bodie, are of the same age as those of the rest of the State, posterior to the upheaval terminating the Jurassic.

Mr. Lindgren expresses the following view in regard to the formation of the gold quartz veins of California: "Replacement proper of the minerals of the country rock along the fissure by quartz I have never been able to observe, and cases supposed to be of such nature have always proved to be due to the shattering of the country rock and the filling of it with silica along narrow cracks. The clean quartz usually forming the vein I cannot account for in any other way than by filling of cavities, as it does not seem possible that a replacement of the ferro-magnesian silicates and other minerals could occur without leaving chloritic stains or other signs in the resulting mass." It seems to the writer that the evidences are opposed to Mr. Lindgren's views of the presence generally of open fissures, during the formation of the quartz. Veins which are known to have been formed in open fissures almost invariably show a more or less pronounced banded structure, caused by successive additions through a long course of time during which the conditions did not remain absolutely uniform. In an open fissure the deposition cannot be conceived as having taken place except from the wall inward, leaving frequently a cavity in the center.

In many districts the quartz veins are quite localized. On the theory that the lenses of quartz along a vein are due either to an opening of the wall or to movements bringing two concave portions opposite, it cannot be conceived why quartz veins are frequently of so limited extent longitudinally.

Faulting is a very common phenomenon in disturbed regions, but quartz veins or mineral deposits of any kind occur only here and there, so that it would seem that, in addition to the formation of fissures, there must accompany it in the local centers of deposition more or less removal of crushed rock.

It can hardly be disputed that the large bodies of manganese, chrome iron and quicksilver in the Coast Ranges, as well as the galena ores of eastern California, have been formed by replacement.

In this discussion the writer does not wish to be understood as arguing that open fissures have not at times played an important part in mineral deposition, but that there are many reasons against that view of the origin of the most gold of the quartz veins, as well as the other mineral deposits of California.

(*b*) *Silver Deposits.* Silver-bearing galena is more often found associated with limestone in irregular chamber-like deposits along mineralized zones. Exceptionally, it occurs in other sedimentary rocks and in granite, in the latter case forming well-defined veins. Calcite and iron oxides form much of the gangue.

Enargite is found only in the Tertiary lavas and more ancient rocks of Alpine county.

Tetrahedrite, bornite, chalcocite, chalcopyrite and stromeyerite occur characteristically in well-defined veins with quartz gangue and in many different formations. It has not been demonstrated that the silver ores are superficial. In the Modock mines the best ore is said to have been obtained at a depth of 1150 feet. The great body of ore at Cerro Gordo has apparently been worked out, but the exploration is said not to have been thorough.

CANADA'S best known mines are those of British Columbia, on account of their rapid development and the large output. But much lively interest is being taken in the mines farther east, particularly in the Rainy Lake and Manitou districts in Ontario and Nova Scotia. From Nova Scotia mines which have been worked for many years the output has been considerable. From the Goldenville district alone over $2,000,000 has been produced. In the early eighties the district was practically deserted because the ore was supposed to have decreased in value, but they were really getting into refractory ores which they did not understand. During the past year two 10-stamp mills have been started up on large veins of good ore and a large number of mines are being exploited. American capital has been put into several of the properties.

Nevada City District Geology.

NUMBER II.

Later History.—At the beginning of the Neocene period the Sierra Nevada formed a mountain range of substantially the same outlines as that of to-day, but of much less height, the summits—located along the same lines as the present ones—having an elevation probably of about 5000 feet, in latitude 38°-39°. The range had been above water since the end of the Juratrias period, and in its lower part long-continued erosion had reduced it to a hilly, undulating country, frequently broken by high ridges and isolated peaks. A drainage system somewhat similar to the one of the present day had been developed, and auriferous gravels accumulated along the streams from the debris of the numerous quartz veins. The stream receiving the drainage of Grass Valley and Nevada City corresponded closely to the Yuba river, but also embraced the watershed of the upper Bear river. Its southern branch came down from Dutch Flat and You Bet with a northerly direction, crossing Deer creek at Scotts Flat and the South Yuba at Blue Tent; then turned westward and flowed down to the great valley by Badger Hill, North San Juan, French Corral and Smartsville. During the latter part of the Neocene period (the Pliocene) volcanic eruptions began near the summit of the Sierra, and masses of volcanic material began to pour down the river channels. The first material erupted was the light-colored, siliceous rock called rhyolite, which was of comparatively small volume, confining itself as a rule to the river channels. The eruptions consisted only to a small extent of molten material, the larger quantity poured out forming volcanic muds, which easily found their way down to the foot of the range. On the lower slopes they became mixed with more or less gravel and sand, and their eruptive character is now less apparent. Very heavy flows of this kind found their way down the old South Fork of the Yuba, and part of them flooded a low divide and filled the Nevada City basin. After a short interval, during which considerable erosion took place, the so-called "cement channels," or "channels of the volcanic period," were formed in certain parts of the Sierra, wherever erosion cut through the rhyolitic flows. No such channels have been found in the district here described. Then the period of andesitic eruptions began, and mud flows again poured down from the vents near the divide, at first as dark-colored, fine tuffs and sands, later as a gray or brown tuffaceous breccia, containing, in the foothills as well as in the high range, larger, more or less angular boulders of the dark-colored porphyritic rock called andesite. These last flows, coming down in rapid succession, flooded everything and covered up the middle slopes to such an extent that only isolated ridges and peaks protruded above them. The whole area here considered was thus once a gently sloping lava field, above which only Banner and Osborne hills protruded. The rough, high diabase ridges of the foothills also rose above the flows. The last of the andesitic flows is supposed to mark the close of the Neocene period. During the volcanic epoch the Sierra Nevada was subjected to a tilting uplift, which at the summit probably amounted to several thousand feet, and the streams at once began the work of cutting into this desolate lava plateau. The directions they took were more generally transverse than formerly. Their similarity to the old drainage was caused by the high, protruding ridges of bedrock, which in many places confined the new river to the old valley. This work of canyon-cutting has been continued with ceaseless energy until the present time. Not only has much of the enormous lava masses been washed away, but, owing to the uplift, the rivers have cut down far below the old Neocene bedrock surface and created the characteristic features of the Sierra Nevada of to-day; these are deep, abrupt canyons separated by broad or narrow ridges of more gently undulating surface.

In the district described in this folio the sloping ridges—Harmony ridge and the Banner Hill–Towntalk ridge—are the only remnants of the lava sheet which once covered nearly the whole region, while the present watercourses, here wholly unlike their Neocene predecessors, are sunk several hundred feet below the Neocene surface. Between the close of the andesitic eruptions and the present day occurred the extensive glaciation of the high Sierra, but the glaciers terminated about thirty miles above Nevada City; and it may be stated with certainty that neither in the Neocene nor in the Pleistocene period have any ice streams extended as far down as the latter place.

(To be Continued.)

Scientific Progress.

The Roentgen Ray Cure for Blindness.

This is surely an age not alone of marvelous inventions in the arts and sciences, but it is also an age of fads, fakes and unbounding faith. There never was a time in the history of the world when people more readily yielded themselves as victims to medical charlatans and quacks than at the present time. On the other hand, there never was a time when such tremendous efforts were made to educate the general public in questions of science and medicine. Commencing with the grammar school up through all grades of our public schools, anatomy, physiology, chemistry and physics are taught in more or less of a rudimentary way. Every monthly journal, every daily and weekly paper has a department devoted to these subjects. Special scientific journals having a wide circulation among the reading public discuss medical questions in every number. Lecturers with stereopticon travel about the country presumably to amuse, and incidentally to instruct their hearers on familiar topics. Almost every family has a book with some such title as "The Family Doctor," "The Family Saddle Bags," "The Family Medicine Chest," etc. Yet, with all these attempts to give instruction, the public are just about as ignorant as ever on the things of which they ought to have some degree of intelligence, and more than ever credulous and ready to accept every tale of marvel which they read in the daily press. The greater the improbability the more readily do the gullible public seize and gloat upon it.

For example, let us consider the latest fad, the X ray cure for blindness. This fad has received its impetus only through the statement of Edison, that within three years the blind, those whose optic nerve is not destroyed, will be able to see. The hopes of many thousands of unfortunate blind, that they may be made to see, have suddenly been raised to a high pitch. Every newspaper in this country has exploited this statement in startling headlines.

Since we know that the eyeball is, like bone, opaque to the X ray, and as the retina in health is unable to perceive any sensation of light from the rays before it has been made visible by fluorescence, we should hardly expect an optic nerve wholly or partially atrophied to respond to an excitation too weak for the normal eye to perceive. To restore vision to a blind eye by exposure to these X rays there must be some action which will cause a regeneration of the atrophied fibres or dissolve opacities lying between the nerve and the anterior surface of the eye. Electricity applied to even a sightless eye may cause flashes to be seen, but the sensations are purely subjective, exactly as the sensations of light which sometimes occur in a person who has lost both eyes by enucleation. This whole business is a delusion and a snare. Mr. Edison has made a serious mistake in permitting his name to be used, as he has to foster hopes which can never be realized. Until he has submitted positive proof in place of the bald assertion that the X rays possess curative powers in any degree, he should be silent on the subject. It must be borne in mind that there is not a particle of difference, as far as the perception of light by the retina is concerned, between the vibrations which come to it from the fluorescent screen or those of any other illuminating point of like intensity having the same wave lengths.

Instead of the X rays having curative power, there seems to be, on the contrary, an impression that these waves may produce harmful results. The way we run after fads at the present day would almost warrant us in accepting Nordau's views on degeneration. However, we have hopes that a time will come when we shall turn over to experts all new discoveries, or alleged discoveries, of sure cures for diseases for thorough examination and trial. We may have to wait until such time as faith in the power of the forked stick to point out the hidden veins of water and mineral give place to scientific methods, but it is bound to come in the fullness of time. —Pacific Medical Journal.

To Detect Foul Air.

It is generally believed that when the atmosphere of a room is impure the fact will be sufficiently noticeable to a person of normal sensitiveness without the aid of an instrument to inform him of the fact. That this is not so, however, is evident to any one who remembers how the suffocating odors of an overcrowded meeting room impress their disagreeable presence on a person coming in from the pure outside air, while, to all appearances, the persons in the room are quite unaware of the air being bad.

To remedy this state of things and show just how bad or otherwise the atmosphere of a room is, a clever inventor has just completed an instrument which shows the exact condition of the air. It consists of an airtight glass receptacle, in which is placed a red liquid. A bent glass tube is inserted into the fluid, and up this tube the fluid runs, to drop at the rate of one drop in two minutes onto a cord that is stretched by a weight. This fluid possesses the property of changing color when submitted to the action of carbonic acid gas. The more of this gas there is in the air the more pronounced the change in the color of the fluid.

With this fact in mind the principle on which the indicator works is easily understood. The drops of fluid, as they fall on the string, change it, according to the condition of the atmosphere.

Should the atmosphere be perfectly pure, the string remains red all the way down. Should it be slightly tainted, the top of the string appears white. The fouler the air the longer the white mark on the string. By the side of the string runs an indicator, graded to show the exact condition of the air. The highest point on the scale marks "pure," the next "passably pure," the next "bad," and from there down to "very bad" and "extremely bad."

The instrument has been thoroughly tested and found to work perfectly.

A CORRESPONDENT of London *Engineering*, to show that the metre is not a measure for the standard, says: "The metre was originally fixed without reference to practical considerations of convenience and utility, but simply as a theoretical fancy, to adopt the 100,000th part of a degree of latitude as the standard measure, with the idea of basing the measure on the earth itself, irrespective of any minor consideration of utility. Unfortunately this was subsequently upset by more correct measurements of the earth, showing that the metre was not really the 100,000th part as intended; and it has now consequently to be referred to an authorized standard metallic measure, like other standard measures."

Electrical Progress.

Copper Refining by Electricity.

There is but little to be said about copper refining or the electrolytic extraction of the metal from its ores. A great deal has been published about refining, and still more about various schemes for extraction, and there would be little use in repeating such accounts here. At the same time, there is a great deal that is not published. Copper refiners seem to think they are working a magic secret process, and that, if they keep all the details to themselves, no others will be able to compete with them. Such ideas are commonly to be found among workmen, but are seldom encountered among educated people; and the probability is that some copper refiners are working their processes as badly as they can be worked, and understand very little about electrolytic work. The unfathomable secret guarded by copper refiners seems to be the use of anodes and cathodes of copper in a solution of copper sulphate. As regards details of management or of processes, such as the best temperature to work at, or the best method of circulating the liquid, there can be very little to learn. It would be much better, says Jas. Swinburne, for electrolytic copper refiners to publish results and compare notes, as if they are competing with one another any knowledge shared equally among them makes no difference, but it puts them all in a better position as competitors in the race with refiners who use ordinary metallurgical methods.

The main difference between the two classes of copper refining processes consists in the series or parallel coupling of the plates. From a purely electrical point of view, this looks like a distinction without a difference, but there is more in it than appears at first sight. It makes little difference in the energy used per ton of copper refined, the only source of divergence being the numerous contacts in the parallel system. When a vat only takes a fraction of a volt, a large proportion of the power may be wasted on imperfect contacts.

The series arrangement, however, saves a good deal of money in the leads and greatly simplifies the connections. It is often supposed to have some magic efficacy in giving a greater output of copper for a given power, but that is absurd. Its great advantage really lies in its needing less copper in the vats for a given output. This may seem a small matter, but if prices are worked out it may mean a very important saving. Take an example: Suppose copper is deposited at, say, five amperes per square foot; and suppose the anodes are cast, say, ¾-inch thick, and are eaten off both sides. Roughly, the anodes will take two months to be deposited on the cathodes. Take the case of a refinery dealing with a thousand tons of copper per month. This means that 2000 tons are in the vats. As a matter of fact, there will be a little more, but we can take 2000 tons as a good round figure. The value of this copper, at $300 per ton, is $520,000. Now the question is: what value is capital to the owners of the refinery? The interest on the copper in the vats is, say, $35,200 a year, or $3000 a month. As the output is 1000 tons a month, this means that the price of refining copper is increased no less than $3 a ton for interest on the metal in the vats. It is then of great importance to keep down the amount of copper going through the works—that is to say, to make it go through quicker. A little can be done by removing the cathodes when they are ⅝-inch thick, instead of ¾-inch, and putting in new ones. This reduces the $3, not to $1.50, but to something above $2.25; how much above $2.25 depends on the cost of the initial cathodes. Many people may say there are such quantities of copper all about a copper refinery that it makes no real difference whether it is in the vats or in the stores. The copper in the vats cannot act in either way, and is quite independent of the stocks held, and it cannot be drawn upon. It therefore

represents capital lying idle. It is still an open question whether the series arrangement, as series arrangement, saves money. At the Bridgeport works, in Connecticut, the system worked out by Hayden is used. The anodes are rolled and are quite thin. The dimensions are about ¼-inch arranged in wooden vats taking something like 120 volts, connection being made to one at one end and to a special cathode at the other. Each of the intermediate plates then becomes both cathode and anode, as one side of it is eaten away while the other has copper deposited on it. As the plates are rolled they are eaten and deposited very evenly, and the process is carried on till very nearly the whole of the copper is transferred. As the deposited copper never sticks tight to the plates, the remains of the original anodes can be picked off the refined copper. There is, of course, a certain amount of scrap anode which has to be remelted and rolled again, but as no leads have to be connected to the anodes, and as they are finally supported by the deposited copper, they can be consumed much more completely than in the case of thick cast anodes. The saving is thus essentially in the use of thinner plates and in the cost of doing away with the necessity for making electrical connection to each plate with its attendant loss of power due to inferior contacts. The saving in leads about the vat house is also considerable. The most important of these points is undoubtedly the thinness of the plates in the vats. There seems no reason, however, why equally thin plates should not be used in the parallel system. There is no reason why the parallel system should be tied down to cast anodes, which must be fairly thick to allow of casting. It might be possible to cast the anodes thinner by adding a little extra silver. The series arrangement has been worked out, no doubt independently, by Smith, Hayden and Stalmann. Cuprous chloride gives twice as much copper as cupric sulphate with a given current; but that is not everything, and unless the resistance of the vat is so low that twice the pressure is not necessary, this does not pay. It might be said that a specially low current density might be used, but that means sunk capital again. "I do not know at all how far the chloride would do, as it might carry over impurities that remain in the slimes in a sulphate solution. Copper nitrate gives good deposits of copper with enormous current densities, but it is probable that silver and perhaps gold are carried over. Swan has made numerous experiments on rapid deposition from the nitrate, but has, I think, published nothing as to its use in refining argentiferous copper. The presence of very little chlorine might prevent silver coming over, but it would hardly stop gold."

Stalmann, who was for some time manager, and who designed the Anaconda electrolyting copper refining works, uses a very ingenious series arrangement. Each plate has paper stuck to one side. A few copper rivets are put through and the paper is blackleaded. This gives a paper cathode, which separates the deposited copper from the crude, and gives no trouble in separating the scrap anodes from the good deposited cathodes.

It is often supposed that everything electrolytic is pure. Unfortunately, this is not necessarily the case. Electrolytic copper is nearly pure, but it is generally, if not always, contaminated with antimony. It is probable this small trace of antimony does harm, as it most likely reduces the conductivity appreciably, and may alter the non-electrical physical properties of the metal. Antimony can be separated from copper by electrolytic analysis. What is wanted is a method which is possible on a commercial scale.

ONE of the largest electric plants in this country will soon be established at York Haven, Pa., at a cost of about $2,000,000 or $3,000,000, and will be about 20,000-horse power. It will distribute a current of electricity throughout the near-by towns, such as Harrisburg, Lancaster, York, Manchester, and all the towns within a radius of thirty or forty miles. It is said that the plant will be the means of the establishment of three or four large mills at York Haven. Early in the spring about 2000 men will be put on the works in order to hasten completion. It is thought that it will take about three years to complete the plant.

Mechanical Progress.

Metallic Carbides.

Among the many new fields of work opened up by the introduction of the electric furnace, according to *Nature*, is the preparation of difficultly reducible metals undertaken with success by M. Moissan. These reductions being necessarily effected by the presence of carbon, the formation of definite metallic carbides of great stability soon becomes apparent, the properties of which came to be of such interest that their preparation was systematically attempted. Certain metals, such as gold, bismuth, lead and tin, do not form carbides at the temperature of the electric furnace, neither do they dissolve any carbon. The metals of the platinum group dissolve carbon with facility and deposit the whole of it, on cooling, in the form of graphite, the metals being unchanged. Copper, silver and iron take up carbon in quantities which, although small, are sufficient to cause marked changes in the physical properties of the metals. It is noteworthy that no definite crystalline compound could be obtained with iron. On the other hand, fused aluminum takes up carbon readily in the formation of the crystalline carbide, Al_4C_3, and the oxides of many other metals furnish similar crystalline compounds when heated in an electric furnace with an excess of carbon. The behavior of these substances with water furnishes the most convenient mode of classification. The carbides of molybdenum, tungsten, titanium, zirconium, the latter having two, and of chromium, also having two, do not decompose water at the ordinary temperature. Of these reacting with water, the carbides of lithian, calcium, strontium and barium furnish a pure acetylene; of aluminum and beryllium, pure methane; of manganese, a mixture of equal volumes of hydrogen and lethane; while metals of the cerite group give crystalline carbides, all of which react with cold water, forming a complicated gaseous mixture containing hydrogen, acetylene, ethylene and methane. But the most complex reaction is that furnished by uranium carbide with water. In this case, in addition to the gaseous mixture containing methane, ethylene and hydrogen, liquid and solid hydrocarbons are produced in abundance. The carbides of silicon and titanium are extremely hard, the latter even cutting diamond.

Inaccurate Glass Gauge Readings.

In a pamphlet issued by the British Board of Trade, Mr. Macfarlane Gray, the chief examiner of engineers, mentions several instances where misleading gauge glass readings, due to defective connections, have been responsible for many casualities, especially in marine boilers. One case was that of a passenger steamer in which two of the furnace crowns were discovered to be down just as she was on the point of starting. A Board of Trade surveyor happened to have occasion to visit the steamer at the time, and the chief and second engineers, both certificated men, told him what had occurred and requested him to note that the gauge glass showed plenty of water in the boiler, and that therefore they were not at fault. Examination proved, however, that the cock on the communication to the steam space of the boiler was shut, this having been done for a survey on the previous day, and forgotten. On opening it the water disappeared out of the glass. The second engineer admitted that he had blown the boiler down to lower the water level, as it was above the top of the glass. Two furnaces were brought down in another steamer at sea owing to the top communication being shut. Other cases, and with more serious results, might be cited, all of them illustrating what serious damage may result from trifling causes which a little thoughtfulness would prevent.

THE New York and New Jersey Bridge Construction Companies have made a contract with the Union Bridge Company for the building of the bridge over the Hudson river at New York, at a cost not to exceed $25,000,000, the Union Bridge Company agreeing to give a bond of $1,000,000 for the faithful performance of the contract.

BRASS that is not subjected to heat may be kept from tarnishing by the application of a lacquer composed of one ounce of shellac dissolved in ¾ pint of alchohol. It may be colored with dragon's blood, saffron or tincture of tumeric.

Practical Information.

Nature as an Engineer.

How suggestive the vegetable kingdom is of engineering problems was pointed out in a very interesting manner some time ago by Sir Benjamin Baker in a presidential address to the British Institution of Civil Engineers. "Every tree," he remarked, "is a vegetable pumping engine, but hydraulic engineers would be sorely puzzled to explain how the large quantity of water required to supply the evaporation from the extended leaf service is raised heights up to 400 feet and above. We know that the source of energy must be the sun's rays, and we know further that, in the production of starch, the leaf stores up less than 1 per cent of the available energy, so that plenty remains for raising water. Experiments have shown that transpiration at the leaf establishes a draught upon the sap, and there is reason to believe that this pull is transmitted to the root by tensile stress. The idea of a rope of water sustaining a pull of perhaps 150 pounds per square inch may be repugnant to many engineers, but the tensile strength and extensibility of water and other fluids have been proved experimentally by Professor Osborne Reynolds, and by Professor Worthington and others. A liquid, deprived of air, entirely filling a glass vessel, when cooled, pulls on the vessel, and at last lets go with a violent click. Water has been so stretched nearly 1 per cent of its bulk, and the adhesion of the water to the sides of the vessel and the amount of the tensile strength were found to be quite equal to that of good mortar. With ethyl alcohol the modulus of elasticity, both in tension and compression, was constant up to the ultimate tensile resistance realized of 255 pounds per square inch. Many hydraulic engineers have, no doubt, lived and died without encountering anything in their experience suggesting that water and other fluids were capable of resisting a tensile stress of no insignificant amount; and yet, as long ago as 1663, the fact was known, for the secretary of the Royal Society then wrote to the Governor of Connecticut that 'what puzzleth and perplexith us is that water defecated from the air remains suspended and doth not at all subside after the receiver hath been exhausted of air;' and, in the same year, the president was asked 'to entertain his Majesty' Charles II. with the sight of quicksilver sustaining itself by tension at a height of 50 inches when the barometer was at 29 inches, 'something else but equipondency of air being,' it was truly said, 'necessary to explain this odd phenomenon.'"

THE largest canals are those of Russia, the system connecting St. Petersburg with the Caspian sea furnishing continuous navigation for 1434 miles. Then comes the Erie canal, from Albany to Buffalo, 381 miles; the Ohio canal, from Cleveland to Portsmouth, 317 miles; the Gotha canal from Stockholm to Gothenburg (Sweden), 280 miles; the Miami & Erie, from Cincinnati to Toledo, 274 miles; the Pennsylvania canal, 193 miles; that from Soonkelassa to Cuddapar, in India, 190 miles; the Chesapeake & Ohio, from Cumberland, Md., to Washington, 184 miles; that from Dublin to Ballinasloe, Ireland, 164 miles; the Delaware & Hudson, from Rondout, N. Y., to Honesdale, Pa., 111 miles; that from the Danube to the Main, 108 miles.

JOHN WOLFE BARRY, in his presidential address to the Institute of Civil Engineers of England, said that the commercial navy of the British Empire in 1837 consisted of 20,500 vessels, with a total tonnage of 2,333,000 tons, and consisted almost entirely of sailing ships, only 624 being returned as steamers, having in all a tonnage of 70,000 tons. At the present moment we have in our mercantile marine 36,000 vessels, with a total registered tonnage of 10,500,000 tons, while out of that total, which includes coasters, less than 4,000,000 tons are sailing vessels. This comparatively small amount of sailing tonnage is rapidly diminishing and that of steamers increasing, so that in the last ten years steam tonnage has increased in round numbers by 2,000,000 tons and sailing tonnage has diminished by 1,000,000 tons. Prior to 1851 there was no submarine cable across the Channel, none to the United States till 1858, nor to India, Australia or South Africa till 1865, 1872 and 1879, respectively. Nowadays the mileage of submarine cables is 162,000 miles, the capital employed in them is $40,000,000 and the total number of foreign and colonial telegrams is about $7,000,000 annually, without reckoning those that are sent by the submarine companies without the intervention of the postoffice.

THE Government of Mexico has recently made some important amendments in the patent law of the country, which affect Article 33 of Chapter V of the law of June 7, 1890, on patents of invention, and also the transient article of the law. Article 33, as amended, reads: "The owner of a patent of invention or a patent of improvement is compelled to prove before the department of Fomento, at the end of every five years of the existence of his patent, and in order to keep it in his possession for the following five years, that the payment of an additional tax has been entered into the Federal Treasury, as follows: At the end of the first five years, $50; at the end of ten years, $75; and at the end of fifteen years, $100. All these payments must be made in Mexican dollars. To prove that these payments have been made at the end of the said period of five years, a term of two months is allowed, which cannot be extended."

THERE is a general idea that lead shot are made spherical by falling from a height. The only purpose of lofty shot towers is to give the shot a chance to cool and harden as they tumble. They are just as perfect spheres when they start from the top as when they reach the well of water 200 feet or so below. The usefulness of the water is merely as a soft cushion to receive them. Shot cannot be made from pure lead, but an admixture of arsenic causes the lead to form globules, like mercury. The molten mixture is placed in a big iron saucepan with perforated bottom, and the drops falling through are the shot. They must fall some distance in order to get time to cool and harden. A batch thus made, they are scooped out of the water, tumbled about in a revolving barrel with plumbago, and finally put through a series of sieves, to sort them into sizes for market.

THE flags to be hoisted at one time in signalling at sea never exceed four. It is an interesting arithmetical fact that, with eighteen various colored flags, and never more than four at a time, no fewer than 78,642 signals can be given.

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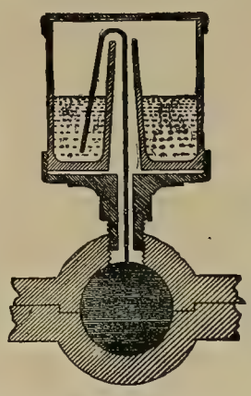
Positively Reduces Oil Bills 75 Per Cent.

THE FINCH OIL CUP.
Frictional vibration by the motion of the shaft against the point of the wire causes the oil to flow, and that this flow is not produced simply by syphonic or capillary action but by frictional vibration is proven by the fact that if the wire does not rest on the shaft then the oil will not flow. When the machinery stops the feed stops, therefore **the Finch Cup is Absolutely Automatic, Feeds Enough Oil and No More, Prevents All Waste, Needs Very Little Attention.**
Read One of the Many Testimonials:
UNION GAS ENGINE CO. SAN FRANCISCO, July 19, 1894.
During the past three years we have used your Cups for the crank shaft bearings of our engines, and also on all bearings of shaftings and tools in the shop. Our engines now *require no attention* except to fill the Cups occasionally, and therefore we can cheerfully recommend the Finch Cups to any one as *being the best in the market.*
K. J. McHUGH, 51 Fremont St., San Francisco, Cal.
General Agent for Pacific Coast. Send for Circular.

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Special attention given to preparing plans for the Chlorination and Bromine Processes of Treating Gold Ores.
PATENTEE { Brown's Complete Automatic Mill Process. Brown's System of Mechanically Stirred Roasting, Cooling and Conveying Furnaces. Etc.
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Patented in U. S. and Other Countries. Capital, £100,000.
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This process has a well-demonstrated merit in treatment of low-grade Gold and Silver Ores, especially those of a complex character, talcose and clayey combinations or slimes, which class of ore, as is well known, cannot be treated by leaching or lixiviation.
Gold and silver values, both fine and coarse particles, are by the PELATAN-CLERICI PROCESS recovered direct from ore without roasting as pure amalgam, and the precious metals are saved in the form of fine bullion without any refining costs.
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All ores, without exception, amenable to cyanide treatment can be treated to better advantage by the Kendall Process. This can be accepted as an axiom.
The manager of one of the largest mines in the Mercur District, Utah, wires: "We now begin to understand dioxide process; last twenty days treated 220 tons per day of $26.50 ore, average of all tailings samples $0.83."
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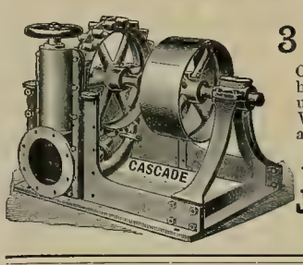

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Coast Industrial Notes.

—The Atchison, Topeka & Santa Fe Railway Co. intends to expend $1,500,000 between now and July 1st, '97.

—Colonel Overton of the Virginia City Water Works has estimated the cost of supplying Reno with pure water from Hunter creek at $74,000.

—A dividend (No. 22) of 25 cents per share has been declared on the capital stock of the Paraffine Paint Co., 116 Battery street, San Francisco, payable December 29.

—The Great Northern Railway Co. has completed preliminary arrangements for the construction of the Cascade tunnel in Washington. It will be two and one-half miles long.

—The entire property of the Seattle, Wash., Consolidated Street Railway Co., consisting of thirty-five miles of roadway, with rolling stock, power house, etc., has been sold under foreclosure for $130,001.

—The owners of the Brown's Valley irrigation ditch has asked the city council of Marysville to pass an ordinance giving them a franchise for bringing electric light and power to that city. It is proposed to supply the mines at Brown's Valley first and then run their lines on to Marysville.

—Exports of flour from San Francisco for the first eleven months of '96 amounted to 1,040,369 bbls., against 859,594 bbls. during the same period in '95, a total export of breadstuffs for the eleven months of 14,101,670 ctls., valued at $16,173,000, against 12,600,000 ctls., valued at $11,891,200, for the same period in '95.

—San Francisco exports of produce for the first eleven months of '96 are $38,123,800, against $30,120,400 for the same period last year, the largest for six years. Of this, exports to Great Britain were valued at $14,616,200, Hawaiian Islands $3,256,500, Australia $3,589,500, Central America $3,069,100, China $2,707,900 and Japan $1,985,400.

—The United States Supreme Court is engaged hearing arguments in the case involving the title to about 800,000 acres of land in southern California. This land was comprised in the original grant to the Atlantic & Pacific Railroad Co. made in 1896, and the dispute is between the United States Government and the Southern Pacific Railroad Co. This grant was forfeited by the failure of the Atlantic & Pacific to build its road within the specified time. The Southern Pacific claims the land on a junior claim.

—E. C. Potter of Chicago lately addressed a meeting in San Diego to consider the proposed steamship line from that place to Japan. Potter's plan is to organize a company with $5,000,000 capital stock, $3,000,000 of which shall be issued. In addition, $5,000,000 of ten-year bonds are to be issued to build four twenty-knot 8000-ton steamers, at a cost of about $6,500,000, the bonds to be secured by the steamers. Southern California is to be asked to contribute $500,000, to be paid when the balance of the $8,000,000 is actually in hand.

—The Oregon Railway Commission reports that not a road in the State has paid dividends for four years or more. Both the Oregon Railway and Navigation and the Southern Pacific show deficits. The latter road (Oregon and California, operated by the Southern Pacific under a thirty-four year lease) has a shortage of $766,028 this year. It was $607,975 short last year. The Oregon Railway and Navigation had a shortage, including rents and taxes, of $2,333,395 in 1894. The showing since is little over 4 per cent on the investment. In 1896 the gross earnings were $2,640,112 and operating expenses $1,621,713; income from operation $1,018,399. The Oregon Central and Eastern is in a bad way. Since the litigation in the courts, when $15,000,000 of capital invested in it was wiped out and the road stood absolutely valueless, there has been expended $100,000 for improvements and still there is not a cent in sight for the purchasers even on their first investment.

Commercial Paragraphs.

THE steamer Czarina, recently rebuilt by the Fulton Engineering and Shipbuilding Co., develops increased speed on her trip to the Beaver Hill Colliery.

THE Mine and Smelter Supply Co. of Denver, Col., has purchased the mining machinery stock of C. W. Badgley & Co. of that place, the latter retiring from business.

EDWARD L. HALLOWELL, millwright, of 115 and 117 Main street, San Francisco, has undertaken the erection of a sawmill with a capacity of 125,000 feet per day for the Sanger Lumber Company at Sanger, and has sent down L. A. Wheeler and M. M. Davidson to take charge of the work. It will be a double band mill, with most approved new appliances.

THE Colorado Iron Works Company of Denver have an order from the Mazapil Copper Company of Saltillo, Mexico, for three latest improved elliptical bowl slag trucks, and also for one double pot slag truck for the Compania Minera Fundidora y Afenadora al Monterey, Mexico. They have lately shipped a 6200-foot Finlayson patent wire rope tramway to the Noble Five Mining and Milling Company at Daudon, B. C.

H. F. BROWN of Chicago is in Congress, Arizona, to complete and put in operation the new Planet-Saturn mill, of the Brown automatic type, 75 tons daily capacity. The crushing is by Cornish rolls, reducing the ores to a 16-mesh size. This pulp is roasted, cooled and conveyed in Brown's combined roasting, cooling and conveying furnace, and charged to the cyanide tanks by Brown's automatic pulp distributor, there being no manual labor required from the time the ore is charged to the crusher until the tailings are sluiced out in the tanks. Mr. Brown will also put in operation one of his combined furnaces of 100 tons daily capacity for the Congress Gold Company about January 1st.

Recent California Mining Incorporations.

American Mining Company: W. Baker, H. C. Stillwell, H. Coffin, W. H. Linforth, G. E. Whitaker; capital stock $500,000—$125 subscribed.

Ashford Mining Company, San Francisco; T. Bull, Santa Clara; W. C. Andrews, San Jose; H. J., L. R. and H. Ashford, Randsburg; capital stock $200,000.

Crescent Vulcan Mining Company, San Francisco; E. J. Bates, M. and E. Savage, M. J. Brandenstein, E. S. Swann; capital stock $5000—all subscribed.

Juniper Gold Syndicate of California, San Francisco; P. G. Gow, J. C. Campbell, N. B. Frisbie, W. H. Metson, F. C. Drew; capital stock $800,000—$25 subscribed.

Recently Declared Mining Dividends.

Portland, Colorado, $30,000, payable Dec. 10.

Anchoria-Leland, Colorado, $6000, payable Dec. 10.

Idaho, British Columbia, $20,000, payable Sept. 22.

Ontario, Utah, $15,000, payable December 31st.

Bullion-Beck, Utah, $45,000, payable December 21st, a total of $1,947,000.

Mercur, Utah, $25,000, payable Dec. 15. This is a total to date of $575,000.

Personal.

HAMILTON SMITH sailed from New York for London last week.

STATE GEOLOGIST T. A. RICKARD of Colorado is en route to London and will return next month.

W. F. PRISK, editor and proprietor of the Grass Valley *Union*, is the youngest and best-looking member of the State Senate.

THOS. PRICE of San Francisco and Chas. Uren of Nevada are surveying the underground workings of the Rawhide mine, Tuolumne Co., Cal.

COL. J. R. FARISH has bought the *Manufacturer and Herald of Trade*, and his experienced management is already noticeable in its improved appearance.

THOS. TONGE of Denver, Col., has gone to England on business pertaining to mining. He takes with him several propositions on properties, the sale of which he is negotiating.

WILL NEGOTIATE with owners or their duly authorized agents only.
WILL INVESTIGATE only thoroughly bona-fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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Mines, Mining Properties and Mineral Lands,
Mining Stocks, Bonds, Options, Leases, Contracts and Securities.
MONEY LOANED ON BONA-FIDE MINES.

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.
WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.
Assay and Chemical Work Done on Reasonable Terms.
Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.
DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

IMPROVED MINERS' LANTERN.
A light, simple, cheap and efficient Lantern which will remain lighted in the strongest drafts. County or State rights for sale on royalty. MRS. HATTIE DELZELL, Jackson, Cal.

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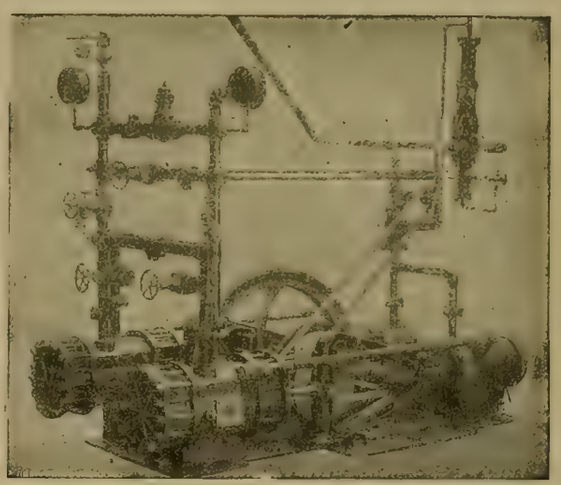

This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to PNEUMATIC POWER CO., at 306 Pine St., San Francisco, Cal. We could save you money, though, in cost of foundations, as our Compressors are half the size of other makes.

H. CHANNON COMPANY,
DEALERS IN
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WIRE ROPE. MANILA ROPE, TACKLE BLOCKS, CHAIN and CHAIN HOISTS. HAND POWERS and HOISTING ENGINES.
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Fossil and Asbestos Sectional Covering.
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By our **EFFICIENT CORRESPONDENCE METHOD.** Thorough Instruction by Competent Instructors. Prices very reasonable. **Apparatus Used by Every Student in the Electrical Courses. Actual Dynamo Construction and Design Taught.** Our 72-page catalogue sent free on application.
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HERCULES GAS, GASOLINE AND DISTILLATE ENGINES.
HOISTING ENGINES, 2 h. p. to 200 h. p. ✦ STATIONARY ENGINES, 1 h. p. to 200 h. p. ✦ MARINE ENGINES, 2 h. p. to 200 h. p.
Our newly designed and perfected DISTILLATE VAPORIZER insures a saving of 50% on cost of running. Just ½ your expense SAVED BY USING A HERCULES in place of ANY other. We make no exception.
NEARLY 3000 HERCULES HOISTING, STATIONARY AND MARINE ENGINES IN ACTUAL USE. HIGH GRADE.
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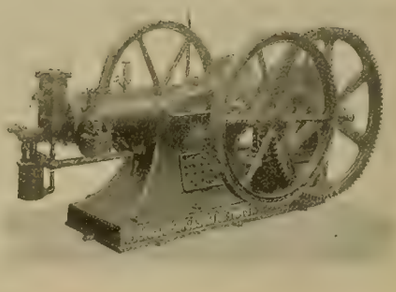
WRITE FOR ILLUSTRATED CATALOG.
ESTABLISHED 1880. **Address HERCULES GAS ENGINE WORKS,**
WORKS: 215,217,219,221,223,225,227,229,231 Bay St. **OFFICE:** 405-407 Sansome St., San Francisco.



Mining Summary.

California Quartz Mills.

That portion of the State Mineralogist's forthcoming report dealing with statistics of mills in the State has been published in pamphlet form. The total number of mills given is 588, with 6216 stamps and 757 concentrators. Besides these, there are given 189 arrastras, patent mills, etc.

In 1858 the number of quartz mills in California was estimated by Prof. Ashburner at 280, with 2610 stamps, but he stated later that in 1861 not over 40 or 50 were in successful operation. Most of the mills enumerated in this report of the State Mineralogist are in operation.

It is particularly noticeable that in many of the newer mills in certain districts there is a tendency to use heavier stamps than were in vogue in California a few years ago. There is one mill—the Big Canyon, in El Dorado county—with 1200-pound stamps. It is a 30-stamp mill. There are 26 mills with 538 1000-pound stamps. No less than 12 of these are in Nevada county. The following table gives the mills of each county:

County.	Stamp Mills.	Stamps.	Arrastras, Etc.
Alpine	3	48	.....
Amador	31	587	7
Butte	11	108	8
Calaveras	53	708	11
El Dorado	63	713	13
Fresno	10	73	4
Inyo	42	132	21
Kern	8	138	19
Lassen	5	40	3
Los Angeles	4	30	.....
Madera	7	120	15
Mariposa	18	242	4
Mono	16	159	2
Nevada	62	575	10
Placer	27	161	5
Plumas	22	315	7
Riverside	13	82	3
San Bernardino	19	249	2
San Diego	16	310	5
Shasta	23	294	13
Sierra	16	242	1
Siskiyou	40	255	14
Sonoma	1	10	.....
Trinity	16	100	16
Tulare	2	10	2
Tuolumne	44	462	2
Ventura	1	10	2
Yuba	5	34	.....
Totals	588	6216	189

Amador.

Dispatch: Congdon Bros. are crushing rock from their mine, south fork Mokelumne river, West Point district. The rock averages $4 per ton. The vein is 20 feet wide.

At the Mitchell mine, near Railroad Flat, a new 10-stamp mill will be ready to crush in a few days. A tunnel is being run along the vein.

The old Turner quartz mine, two miles from Angels, has been taken hold of by W. J. Gracon of Chicago.

At the Alma the shaft is down 950 feet.

The Argonaut shaft is down 1400 feet.

At the Gwin the forty stamps are all dropping and work smoothly. Drifting is going on. Rock is being taken out to keep the mill going regularly.

Record: Work is to begin at once upon the El Dorado mine at Amador City. The old shaft, which is 300 feet deep, is to be cleaned out and then drifting on the vein will be put under headway. Sloss and Newman of the Alaska Commercial Company are the principals in the new enterprise and T. C. Mayon will have charge as superintendent.

Ledger: The new hoisting and pumping plant at the Dennis Kelly mine, near Pioneer creek, has been started up. Sinking and other mining operations will be resumed immediately.

The Jackson Exploration and Development Company, through the general manager, James E. Dye, has let a contract to sink 100 feet in the Amador Queen.

Republican: At the Reward mine an additional five stamps of the mill have been in motion since Dec. 1st. The mill is now of ten stamps capacity.

The old Keystone mine, at Amador City, is taking out ore of a richer character than has been seen for a number of years past. It is coming from the 500-foot level.

Butte.

Oroville *Register*: About 1200 acres of land in South Thermalito was mined years ago by Chinese. They were unable to go down deep on account of the presence of water and the lack of suitable machinery.

F. T. Sutherland has bought 140 acres of land for himself and 340 for a syndicate he represents. They will put in a large dredging plant.

Doolittle & Hammon will also handle their land in the same manner. It is stated that these dredging machines will handle this earth at a cost of 5 cents per cubic yard.

It is estimated that from 500 to 600 men will be employed on these mines.

Register: K. A. Hughson of Oakland and others have bonded the Bishop mine, located near the Palo Alto mine, three miles from Merrimac, and propose equipping it with a 10-stamp mill and other machinery early in the spring.

Calaveras.

Prospect: On the Quartz Glen, the old Foote & Thompson mine, the developments at present being made consist of a 900-foot tunnel following the lead at a depth of over 500 feet from the old Foote & Thompson works. Another tunnel, 350 feet above, is in 1000 feet and a raise has been run 160 feet, which tapped the tunnel worked in early days.

Citizen: Last month the Roanoke Mining Company at their mines—the Moser and Lamphear, at Mokelumne Hill—ran the mill twenty-six days, and the cleanup amounted to $11,000, leaving a net profit, after paying expenses, of $6000.

El Dorado.

Nugget: At the Grand Victory they are sinking below the 200 and are down 90 feet. Twenty stamps are running constantly.

They are running two Huntington mills on the Salsbury with satisfactory results. They are also crosscutting in the lower level and are meeting with good prospects.

Ten stamps are running constantly on the Starlight with good result, and the mine is looking well.

Five stamps are hammering away with good results at the Larkin.

On the Griffith Consolidated, the property recently acquired by Mr. Stent, they have struck on the 115-foot level 6 feet of ore.

A little 2-stamp mill on a ledge 12 feet wide, situated just below Shingle Springs, on Mr. Skenk's ranch, is turning out $3000 a month.

The Taylor mine is said to be sold to an English company, who will soon put on a large force of men.

The deal for the sale of the Esperanza mine is reported closed up. The company that has purchased it will expend $200,000 in prospecting, it is said.

Republican: E. Hancock of Placerville has purchased a half interest in the Brewer & Marquart gravel mine, belonging to the estate of H. H. Brewer.

Mariposa.

Miner: Denver capitalists have bonded a group of mines near Horseshoe Bend, owned by Clark, Brown and Mast, and a water right for electric-power purposes.

A 2-stamp mill is in course of construction at the Burton mine, near the Louisiana.

The Merced Company are increasing their force of miners slowly, and new development work is being commenced on their several mines.

The Laura La Grande mine at Hazel Green, owned by the MacFarlanes and Duncan, has been closed down for the winter. Five stamps more will be added to the mill in the spring.

Mono.

Miner-Index: Although the cyanide plants have mostly shut down on account of the cold weather, the upper Standard plant will run during the winter, as the new method adopted to force tailings through pipes direct from the mill into the cyanide tanks proves to be a success.

In the Phœnix mine, on Queen Bee hill, several men are taking out fair-grade ore and will soon have a crushing.

Graham & Co. have again resumed the extraction of ore from the whim shaft on the Noonday property.

There is a force of men employed at the Gov. Stanford shaft, with good prospects.

In the Free Coinage mine men are exploring ground.

At the Addenda—or, as it is now called, the Contention—a large force of mechanics and miners are employed putting up heavy machinery, which will soon be in readiness to operate on the 500 and 600 levels, where a great deal of ore is in sight.

At the Con. Pacific N. Tobias is extracting ore.

The Bodie Tunnel ground has been partially explored, particularly by leasers, who have done so well that the owners, Cain & McCone, bought out the leasers and started up the mine and mill actively, and are now extracting and crushing about forty tons of ore per day, averaging $20 per ton.

The Bodie, Bulwer, Sunshine, University, Belvidere and other mines are steadily operating.

The last crushing at the Syndicate resulted satisfactorily, so that Captain Tyack has started men to work taking out ore for another crushing.

The shaft on the Midnight mine is being retimbered, preparatory to the extraction of ore which is in sight below.

Nevada.

(Special Correspondence).—J. J. Halpin of New York City, general manager of the Brunswick mine at Grass Valley, who has been inspecting this property recently, has placed a new superintendent in charge and returned to his home. The 20-stamp mill which has been idle since October, for the purpose of erecting new tramway and ore bins, will be started again on January 1st. The company has a 4-foot ledge on the 800 and a like vein on the 900 level, of high grade ore. This property was idle for seventeen years, after an English company had worked it to a depth of 300 feet, until the present company purchased it five years ago. The company is incorporated, but not a share of stock is for sale.

The Pennsylvania at Grass Valley has a 5-stamp mill and has reached the 800 level. One month's cleanup resulted in a product of $10,884 in gold and $1,605 in sulphurets.

Union: The miners in the Mountaineer have uncovered a ledge in the bottom of the shaft. The ore shows well in free gold.

In the Lucky Al, belonging to J. Sawtelle of Marysville, a 3-foot ledge has been struck.

Transcript: In the Giant King, in the Washington district, on the surface the pay chute was about 25 feet wide, and at a vertical depth of 200 feet it is 76 feet in width. Samples of ore have been taken every few feet on the croppings and in the tunnel and tests made, the average of all assays being $5.65 per ton.

Union: A good ledge has been struck in the 265 level of the Home mine. It is 4 feet wide.

Placer.

Colfax *Sentinel*: Development work is in progress at the Bald Mountain gravel mine, twenty miles above Westville. They expect to work six men during the winter.

At the Cedar Creek gravel mine, near Shady Run, Superintendent Rodger will make an upraise into gravel from the lower tunnel about December 25th.

At the Derby mine, at Centerville, an upraise has been made 800 feet in on the main tunnel. Gravel was found and the prospect drift is now about 40 feet ahead of the main tunnel.

The new lower tunnel at the Drummond mine is being crowded rapidly ahead. Power drills are used.

Hoffman, McDonald & Henning have a permit and are preparing to mine by the hydraulic process at the Gilbert claim on Georgia hill, Yankee Jims.

The tunnel at the Eureka gravel mine above Centerville is now in 1777 feet.

Plumas.

Independent: C. D. Hazzard, owner of the Plumas Imperial mine, has been making extensive improvements on his property, preparatory to an active season's work. New ditches and flumes have been bui t, pipe laid and the restraining dam raised.

Professor Thomas Price has started work in the Diadem mine for the people who contemplate purchasing it from Major McLaughlin and others.

San Diego.

Yuma *Sentinel*: The Ponce de Leon Mining Syndicate has fifty men at work doing the assessment work on its mines in the White Gold and Picacho basins.

The Golden Dream Company is crowding the work on the Alfonso, Little Frank and Sambrano shafts, on the Noonday mine, in each of which rich ore has lately been struck.

The Gold Crown Mining Company has completed the possession work on its group of five mines on the Yellow Gold vein.

Senator Dorsey, W. A. Farrish of Denver, Colo., and C. J. Bell of Scotland have completed their examination of the Picacho mines and are on their way to London, where the deal will be completed for the thirty-six mines secured by the Senator.

Shasta.

Searchlight: There are about 1000 tons of ore on the Lucky Baldwin dump awaiting the completion of Captain Roberts' mill, which has just been finished. The lowest tunnel on the Lucky Baldwin is now 260 feet in and runs on good ore all the way, with 3 feet average width of ledge.

Captain Roberts has started development work on the Gold Hill, a parallel ledge. About forty men are employed on this property.

A. J. Fowler and Fred Hurst have purchased the old mill formerly run as a custom mill by W. R. Conant, and are crushing ore from their property, the Lucky Baldwin Extension.

Harrison Gulch contains a population of 300 and is growing rapidly.

The owners of the Uncle Sam mine, the Sierra Buttes Gold Mining Co., have started a crosscut prospect tunnel on the lowest level. The objective point is the North Vein. This ledge shows up well on the surface.

The Furnaceville mines on North Cow creek, owned by an English company and under the management of J. Enright of the Shasta Lumber Co., have been closed down for the winter owing to the rain. The thirty-ton smelter of the water jacket pattern has treated the rebellious ores satisfactorily. A small smelter was used for the experiment, but as all arrangements will permit an output of 100 tons daily the smelting capacity will be increased when work is resumed.

At French Gulch the Ellory mine, superintended by G. W. Grayson, Jr., is working fifteen men.

Six men will shortly be put to work developing the Sibyl claims, recently sold to a New York company by W. B. Murdock.

In the Gladstone mine five men are doing prospecting work, in the hope of again opening up this property.

Siskiyou.

Journal: The quartz ledges around Scott Bar have all closed down, and no work will be done.

The owners of the Mabel mine expect to take a large amount of ore out next year, the building of their new mill this year having interfered to a great extent with their work at the mine.

The placer mines in the Salmon river country will all be in operation soon, and will no doubt have as good a season as usual.

The Black Bear is at work, but the 20-stamp mill at the Gold Ball mine is still idle. It has been reported several times that the differences over the Gold Ball were to be settled and that the mine was to be started up, but as yet nothing has been done, and the property is still in charge of a keeper.

Negotiations are under way for the sale of the Commodore mine on Barkhouse creek.

The hydraulic miners on the lower Klamath are at work, and will be enabled to keep at it through the winter, as they have a large supply of water and considerable snow has fallen in the mountains already.

At the Katie May mine on Greenhorn creek the owners, Bailey & Carrick, are running a tunnel to tap the ledge lower down.

Journal: The big Espey, Hunter pump, on Shasta river, near the electric light plant, will soon be started up, the property now being owned by Harry Hunter and George Simmons. This pump is said to be one of the largest ever manufactured, forcing the water to a height of about 530 feet, and a distance of about 1100 feet to the brow of the hill, being carried from there in ditches and flumes to the mine just below Hawkinsville. At first, considerable trouble was experienced in the working of the pump, but it finally worked most satisfactorily, no trouble having been realized for some time previous to its closing down.

The mines on the Klamath river will no doubt have to close down after this heavy rain, as the streams have all been rising quite rapidly.

Trinity.

Journal: At Cinnabar the Altoona Quicksilver Company are working a full force of men and will do so through the winter. On the mine the company is working its main shaft, which it will continue 400 feet below the lowest level, thus opening up a large body of ore.

At the Integral mine twelve men are at work. The company is running a deep prospecting tunnel. They are in 400 feet and intend driving the tunnel in 1200 feet.

At the Strode mine above Trinity Center the mill has been shut down for the season, but the mine will be run through the winter. A short time ago the lower tunnel cut the ledge at a depth of 800 feet, giving over 500 feet of new stoping ground.

At the Nash mine on Coffee creek the company have been working about seventy men this fall, but have now reduced the force to twelve, as that is all that can be worked to advantage.

The Hill group of mines on Coffee creek and other prospects have been closed down for the winter.

The Bloss & McClary mine is thoroughly fitted up and is being run night and day.

NEVADA.

Pioche *Record*: The Burro mine, worked by Baker and co-owners at State Line, is said to be the only prospect now turning out ore in paying quantities there. The vein is still small, but it is very rich. Other claim owners are still working away.

Walker Lake *Bulletin*: Eighteen tons of Oneida ore were milled in Hawthorne last week, and the product was $1800.

At Silver Peak the Silver Peak Co. has another run of ore on the mill dump, which will keep the mill going for ten or fifteen days. The ore comes from the Drinkwater and Western Soldier mines, which would be valuable properties if developed and properly worked; but as long as the present process of gouging goes on and the mills are employed half the time, they are a curse rather than a benefit. Carpet-baggers have gutted and gouged here for all the thirty years since the discovery of the district, and the 800-foot tunnel on the Mary mine is the only legitimate mining which has been done in all that time.

Over in Alida valley Barnes, Keyser and Cunningham have made another shipment of silver ore which will average 2000 ounces to the ton.

White Pine *News*: The North Mountain Mining Company at Egan, having satisfied themselves that the cyanide process is a success, have decided to change the battery to the roller process with a much larger crushing capacity.

The negotiations for the purchase of the Ben Hur, Belmont and two other mines in Granite district, Steptoe valley, the property of W. D. Campbell, have taken definite shape. The purchasers have entered into an agreement to pay $25,000 for the property, including Mr. Campbell's ranch, water rights, etc. The development of the mines must also be continued during the time in which the payments are to be made.

Recent assays from the new strike on the Midnight run $155 in gold and 12 ounces in silver.

Hawthorne *Bulletin*: Col. Ed. Boyle, W. D. Tobey and Bud Bliss have visited the Big Indian mine to determine the point of starting the 1000-foot tunnel. Work will begin next month.

Reno *Gazette*: The Nevada National Nickel Company of Cottonwood, in Churchill county, will start up its electrical plant next week. The Nickel Company has spent large sums of money in an electrical plant for reducing the ore, and if the experiment is a success, regular shipments will be made after next week.

OREGON.

JACKSON COUNTY.

Taylor & Crow brought up another carload of 13¼ tons of ore from their mine, near Merlin, which netted $2,866.77.

Supt. James has begun work at the Shorty mine.

Democrat: The Virtue, White Swan and Flagstaff, just east of Baker City, employ about 200 men steadily. Then there are many smaller companies operating. The E. & E. Con. Mining Company, North Pole Mining Company, Columbia Mining Company and the Luverne Mining Company at Bourne and the Bonanza Mining Company at Clifford have headquarters at Baker City.

The Perry mine, operated by J. W. McCoy, has 400 feet of shafts and tunnels. He will sink 100 feet deeper, or to water level, at which time a mill will be erected upon the property.

W. Talmage, a capitalist of New York, has secured a ninety days' option to purchase the Sparta canal and quartz properties, owned by Captain Clough.

The Gold Ring Mining Company contemplates extensive development on the Rachel mine. A mill will be erected on the property in the near future.

With the opening of the coming placer season the Grant Brothers will carry on operations on a large scale at Granite. They will employ upwards of 100 men.

The south extension of the Ohio, known as the Climax mine, owned by G. W. Grayson, is being developed under the direction of Phil Bishop.

The shaft at the Columbian mine is being straightened and a skip is being put in. Drifting on the ledge is to be started.

Jacksonville *Democratic Times*: The Blalock mine, on upper Grave creek, is being operated with two giants in a red gravel formation, with good prospects.

Operations have been resumed at the Black Channel Company's mines in Foots creek district. About thirty men are employed. Some

extensive improvements have been projected and a ditch will be dug and reservoirs built.

The Oregon Siskiyou's Mining Company has been incorporated to develop mining property in Jackson county. The capital stock is placed at $50,000. I. G. Rowley, G. H. Himes and A. Rowley are the incorporators.

WASHINGTON.

Spokesman-Review: W. M. Pinkerton of Boundary has sold the Hall mines, known as the Washington and J. I. C., to W. H. Reid of Tacoma for $12,000. The ore assays $4 in gold, 45 ounces in silver and 70 per cent lead to the ton.

From the Snowshoe mine 150 tons of ore are being taken daily.

A. A. Brann, in connection with other Spokane parties, has bonded the Standard mine, near Chewelah.

BRITISH COLUMBIA.

The titles to the townsite of Sandon, British Columbia, are to be questioned by the Kaslo and Slocan Railroad, on the ground that the land in controversy is within that belt of country granted as a subsidy to the railroad by the Government. During the past year the townsite has been well settled and a great many transfers have taken place.

Surveyors are picking out a line for the Great Northern Railroad into the Kootenay mines. With the completion of the Trail & Robson Railroad, which is expected by the first of May, three competing lines will be bidding for the business of the Slocan district—the Spokane & Northern, the Trail road and the Canadian Pacific.

Montana mining men have bonded the Ram's Horn group of mines, eight miles north of Fort Steele, East Kootenay, for $50,000.

At Rossland the War Eagle has been compelled to close down two or three times of late owing to the impossibility of getting the accumulated ore out of the way.

The Ida May, on the east slope of Red mountain, has been sold to a syndicate organized by A. B. Clabin for $6000 cash.

At the Ottawa the crosscut has gone into solid ore 4 feet and the hanging wall has not yet been reached. The ore on the surface is arsenical iron, but that found below carries about five per cent copper. Assays obtained show the ore to be worth $40 per ton, as follows: Gold $33.60; silver two ounces, copper five per cent.

Spokane *Chronicle*: Mackenzie and Dick, of Rossland, have bonded the Alpine group of four claims on Eight Mile creek for $60,000. They have a very strong free milling ledge which will average ores $20 to the ton and intend putting up a stamp mill early in the spring. These two gentlemen have also bonded properties in the Ocean group on the head of Lemon creek for $37,500.

North and Grant-Givan of London, who bonded the Little Darling and Flossie L. last September, have made the first payment on the bond. They have cabled, asking for an estimate of the probable cost of developing these properties.

The Hall Exploration Company has bonded from J. J. Malone, P. T. Stimley and T. G. Roy, the Apex, Silver Reef, Acme and Curfew on Toad mountain for $30,000.

In East Kootenay a large amount of placer work was done on Wild Horse creek this year and it is estimated that $100,000 was taken out by the companies operating there.

The British Canadian Gold Fields Company has purchased the Voyageur claim in the Slocan. Work will commence at once.

UTAH.

Tintic *Miner*: At Tintic a company has been organized with $300,000 capital stock to work the Rabbitsfoot.

The new working shaft on the North Star is now down 120 feet and will be sunk probably to the 1000-foot level without stop, except to cut stations.

The shipment of a 22-carload lot of concentrates from the Mammoth mill this week is the largest single shipment of the kind ever made from Tintic.

Salt Lake *Tribune*: At Mercur C. H. Jacobs has started ten men to work on the Dexter group, just east and south of the Cannon shaft.

The enlarged milling plant at the Geyser, with a capacity of 110 tons, has been started up.

The Mercur mine is reported looking better than ever before. At the bottom of the incline, off the Resolute tunnel, a body of ore heavily impregnated with cinnabar is now exposed, while at a point under the old Mercur tunnel a new and independent stratum of ore has been uncovered.

The shaft on the Gold Reserve, which is now down 100 feet, will be continued another 400 feet. It lies east of the Overland and is owned by Wall, Davis and others.

It is stated that work on the Glencoe and Annie will be resumed early in the year.

The Niagara management has made the connection, for which it has been driving for some time, between the shaft on the Spanish and tunnel from the Eighty-nine, and sinking on the ore will begin at once. The work was undertaken a short time ago and after an unsuccessful effort had been made to locate the ore chute from drifts off the "long tunnel," which has now penetrated the hill for a distance of nearly 3000 feet.

At Silver City the shaft on the Sunbeam is now at a depth of 350 feet.

The promoters of the North Star are contemplating the erection of a mill.

The managers of the Dalton & Lark have about decided to erect reduction works to handle their ore. If the plans are adhered to the works will be erected on a much larger scale than was originally intended, and will be of sufficient capacity to handle the ores from a number of other properties in the same locality.

At Maysvale the Webster, owned by R. C. Chambers, J. B. Haggin and W. R. Hearst, has been extensively explored. A tunnel has been run in on the ledge for a distance of 1400 feet, and in the breast there is exposed 6 feet of galena and carbonate of lead that shows 23 per cent lead, 25 ounces silver and gold of the value of $1.50 per ton. From the tunnel station a crosscut was recently run 180 feet west and in the porphyry is now exposed 10 inches of the very high grade ore that has at times been found in the district. The strike has created considerable excitement in the locality.

At the Crystal the ledge was reached at a point 200 feet from the mouth of the tunnel, and drifting is now going on in both directions from that station. The ore—of which there are 5 feet—shows a value of 30 ounces silver, 25 per cent lead and $3 in gold.

Park *Record*: Operations in the deep shaft at the Lucky Bill have been suspended for the present, and the company is devoting all its energy to sinking the winze on the new ore body recently discovered.

A large shipment of high grade ore has been made from the Woodard lease, on the southeast end of the Crescent Company's ground.

The vein recently encountered in the Alice is more than holding its own in appearance, and looks better than it did two weeks ago, when first cut. The shaft is now nearly 200 feet deep and has gone through two separate veins.

Charles McFalls and associates are about to let a lease and give a bond on their New York group of claims, lying south of the Ontario.

Park *Patriot*: The Crown Point shaft is down 320 feet. A drift is being run from that point to tap the ledge.

The Daly West is taking out about 150 tons a day, but owing to the condition of the roads is not shipping.

Bingham *Bulletin*: Operations at the Frisco mine include a new shaft, sinking by three eight-hour shifts.

The Dalton & Lark force is being increased, and there are now thirty men at work.

IDAHO.

Cœur d'Alene *Sun*: At the Idaho mine the new strike has widened to 6 feet, 3 feet of which is shipping rock.

Spokane *Chronicle*: In the Florence district it is proposed to commence a tunnel at near the level of the Salmon river and running for a distance of about four miles to tap the entire camp at a depth of about 2000 feet. The tunnel is to be made large enough to admit of a double track and will be provided with air drills and electric light, the power to be supplied by compressed air. A company has been incorporated to carry on the work, and all the claims in the line of the tunnel are now being pooled.

The Hi Yu has been secured by A. Walker, who will incorporate a company to operate it.

The Ozark Company has recently put in a 5-stamp mill on their property.

The Oregon has been purchased by Tedrow and King, who will put in a hoist and begin the work of sinking a shaft.

The Lucky Boy near Custer City is turning out fifty tons a day.

Spokesman-Review: At Murray in the Dora and Katie Burnett Consolidated Mining Company's property a new strike has been made in the tunnel at the level of the mill, and consists of a 6-foot ore chute, 3 feet of which will be shipped to the smelter as crude ore, it running so high in sulphurets that the amount lost through milling would be greater than the freight on the waste that would be extracted.

SOUTH DAKOTA.

Black Hills *Times*: About twenty men are working on the Richmond and good ore, carrying silver and lead, is being taken out.

At the Ellenberg fraction a depth of 30 feet has been attained, at which point the ore assays $68.40 per ton.

At the Sundance they have come to gouge matter at a depth of 250 feet.

MONTANA.

Marysville *Mountaineer*: The 200 men laid off by the Boston & Montana have gone to work again.

At the Gold Coin the ledge is opened to the surface by shafts and surface openings a distance of 2,000 feet, and it is from 9 to 16 feet in width. It is claimed that there are 200,000 tons in sight. It is expected to start up the new mill soon.

The Pennington property which was sold two years ago to an English syndicate will be started up. A representation has arrived from London to let contracts, and to engage a force of men to erect a 10-stamp mill and dwelling houses at once.

At the headwaters of the Big Blackfoot river a Helena company has several men making copper locations and Marcus Daly has a number of men developing prospects in the same locality.

Great Falls capitalists have bonded the Independence claims lying northeast of the Alabama.

The total output for October for the Montana Mining Company, Ltd., was 6,400 tons of ore, which contained 4,270 ounces of gold, and 20,960 ounces of silver of an estimate value of $99,100. The expenditures were: Working expenses on revenue account, $32,100; outlay on developments, $12,300; outlay on Blue Bird and Hickey mine, $100; extraneous expenses, $4,300; permanent improvements and machinery, $200; total, $39,300, leaving a net result of $59,800.

The Little Kid mine, on Meadow creek, is running day and night on good ore, and about twenty tons per day are treated.

At Philipsburg, W. J. Quigley is appointed receiver for the Golden Sceptre Gold Mining Company at Quigley.

Inter-Mountain: Much interest is attached to the fact that bids are asked for sinking the Atlantic shaft an additional 200 feet. The Atlantic is the extreme eastern property of the Boston & Montana, upon which a shaft 600 feet deep has been developed. During the past few months crosscutting has been in progress and several stringers of copper ore of a low grade have been discovered. At a depth of 600 feet, while running the crosscut tunnel, the workmen cut through the bed of an ancient river channel. It is the belief of a good many California mining men in this city that if this ancient bed is prospected it will be found to be rich in gold.

COLORADO.

The Lillis Coal Mining Company has been organized at Telluride, Colorado. It has 600 acres of land underlaid with coal, and proposes to supply Telluride mines and others.

Central City *Register-Call*: The November output of the Hidden Treasure, Indiana and Kansas mines in Nevadaville, which are operated by the Gold Coin Mines Company, reached the total of $23,000. The Gold Coin Mines Company operates the largest producing properties in this county, and employs a force of from 150 to 160 men in its mines and mill.

At the Bobtail a total of fifty stamps are crushing ore, twenty-five of which are treating ore taken from the Bobtail tunnel and incline by tributers. The other twenty-five stamps are dropping on ore from the Fisk mine.

At the Mead mill the forty stamps are kept running day and night on ore from the Gunnell mine.

At Idaho Springs a plan is on foot for cutting the many lodes on the Alps mountain with a tunnel and at the same time furnishing drainage and cheap mining and transportation from the Chicago creek side.

Chicago capitalists have secured control of the Olivette claim and are preparing to develop it.

The Iowa Gold Mining and Milling Company of Silver Lake basin, San Juan county, reports $27,000 as the output for November, resulting from the treatment of 700 tons of dry concentrates, which represents 2800 tons of crude ore, an average of about $9.64 per ton, as the ore comes from the mine. The mine and mill now employ 125 men, and the daily product is 125 tons of ore, of which eighty tons is treated at the mill, more than 33 per cent of the output being stacked up as a reserve for the mill.

Denver *Republican*: At Cripple Creek the November production of the Isabella Company is given at 400 tons of smelting and an equal amount of mill ore, the net proceeds being $30,000. The profit was about $15,000 and was added to the $74,000 reserve fund of the company. The seventh level, run from the 550-foot station in the Buena Vista incline shaft, is run 300 feet into the ore and shows an improvement over the level above. The November record is about $7000 better than that of October. The mine employs 135 men.

The Foley Leasing Company shipped fully 1000 tons of ore from the Lillie during November. Of this 300 tons were first grade, averaging about $80 a ton, and the balance a $35 grade.

A sixth level is being started from the bottom of the 500-foot shaft of the Lucky Guss, and the ore being broken in its progress is some of the richest that has ever been mined in the property.

A mining camp of which little has been heard is that lying east of Victor in the Cripple Creek mining district, in which about 800 claims have been located, thirty of which have been prosecuted to patent. The district is comparatively new but has attracted a great deal of attention from Cripple Creek mines and enough work has been done to show that it has an immense deposit of low-grade ore. In several of the claims considerable bodies of sylvanite have been discovered.

The Elkton mine broke all records last month. The gross production from the property is placed at $85,000. The smelter and mill charges aggregate about $10,000, and the mine operating about $13,000, which leave the net earnings about $62,000.

At Silverton the Iowa mine is shipping at the rate of fifty tons of concentrates per day.

The Homestake on King Solomon mountain is to be opened up soon for a winter development campaign.

The Guston has recommenced operations with about twenty men.

Twelve men are working in the Hercules on Sultan mountain and shipping a car per week to the local smelter.

At Puma City a strike of sylvanite has been made in the Climax mine, owned by Wm. Stubbs. An assay made by a local assayer returned $20,000 per ton. This is the first sylvanite that has been found in this district and bears out the claims made by the early prospectors, who went from Cripple Creek and made locations as early as 1893, and who firmly believed that it was an extension of the same ore belt upon which the Independence and Portland mines are situated.

Mining Record: At Lake City, on the Black Crook group of properties, a 700-foot tunnel has been driven during the past summer, and during the first days of December a body of ore carrying telluride of gold, ruby and wire silver was encountered in the drift now being run upon the vein.

The Crown Mountain tuunel, a proposition to cut the Silver Coin, Armatage, Garlock and Rip Van Winkle veins in Hotchkiss mountain at a great depth, has been resumed.

In Pitkin Leadville and Chicago parties have started up the Raymond mine.

The Iris tunnel, being driven by Pittsburg, Pa., parties, is now in about 200 feet. It is crosscutting an immense mineralized porphyry dyke.

Pitkin *Miner*: The Iron Cap property, adjoining the Red Jacket, owned by the Cleopatra Silver Mining Company, was started up last week.

Henry & Wyckoff are operating the Mono cyanide mill with success.

ARIZONA.

Globe *Silver Belt*: An important strike of rich ore is reported to have been made recently in the Mazatzal copper mines, near Payson, and bonded to E. E. Wann, of Denver, who is working a force of twenty men developing the claims.

Tucson *Star*: A shipment of 250 tons of ore is being made from the Duquese mine to Pittsburg, Pa., for a trial test.

Phœnix *Republican*: At Congress camp the 40-stamp mill of the Congress Gold Company is running full time. The company is practically rebuilding the cyanide plant and is erecting a large roasting furnace in which to roast the tailings before cyaniding. When finished this will be the most complete and best cyanide plant in Arizona. The camp has grown wonderfully in the last twelve months, having more than doubled in that time.

Shear & Falco have several men at work on their property tunneling.

MEXICO.

Nogales *Vidette*: The mining camps of La Colorado and Minas Prietas are but a mile apart. The principal mines are the Creston, the Grand Central, the Amarillas, the Colorado and the Verde, although the last two named are at present not being worked.

The Creston mine supplies with ore the Prietas mill with forty stamps and the Colorado mill with thirty stamps and three Huntington mills. About one-third of the ore is taken from the lower or 1000-foot level. Most of the ore, however, is now taken from the 800 foot level. The entire production of the mine is from 180 to 200 tons daily, but it is claimed that, worked to its full capacity, this mine would keep 200 stamps constantly at work.

A depth of 500 feet has already been attained in the Amarillas mine, the ore from which supplies the Grand Central mill, with ten stamps and three Huntington mills, and the Amarillas mill with twenty stamps.

At the Grand Central mine a new four-compartment shaft is being sunk which is now down 180 feet. The shaft will be sunk to a depth of at least 1000 feet and the first station will be put in at a depth of 800 feet.

SOUTH AFRICA.

The following reports from large mines on the Rand for September—one, the Ferreira, for the quarter ending Sept. 30—show some striking similarities that are the result of careful management. On the Rand the mine owners are thoroughly imbued with the idea that every effort must be bent toward economical working of ores. The fact that a slight reduction in this cost will add more to the value of a mine than anything else, is appreciated there more than anywhere else. The managers are not looking for new ore bodies, as are those in California and other fields, so much as cheaper methods of working. This is shown by the careful management of the mills, which are kept running full time, and the large amount of work in crushing got out of the stamps.

May Consolidated.—100 stamps ran 27 days, crushing 12,250 tons; gold won (average yield, 6.044 dwts per ton), 3,700 ozs; value, £13,413 15s; tailings treated by cyanide, 9,250 tons; gold won (average yield, 4.216 dwts), 1,950 ozs; value, £5,850. Working costs, 21s 2 90d per ton; total, £13,010 10s 7d; tailings treatment (Siemens-Halske process), 2s 8.806d per ton; total, £1,264 7s 9d.

New Primrose.—Mill: 160 stamps ran 27 days 6½ hours, crushing 22,912 tons of ore, yielding 6,093 ozs of smelted gold, at a cost of £19,921 for milling, mining and general charges, equal to 17s 5d per ton. Cyanide: 13,090 tons of tailings yielded 3,950 ozs smelted gold: cost, £3,075 0s 2d, or 4s 8d per ton. Mine: Risen, 150 feet; driven, 818 feet; sunk, 198 feet; developing, 35,155 tons of ore. Financial: total cost of working, £22,996. Profit for month, £11,721.

Rodepoort United Main Reef.—Mined, 8,425 tons: less waste rock discarded, 800 tons; milled, 7,625 tons; developed in excess of that mined, 7,834 tons. Mill: Days working (70 stamps), 26; tons crushed, 7,625; yield in gold, 3,249 ozs 17 dwts; yield per ton, 8 53 dwts. Cyanide Works: Tons tailings treated, 4,593; yield in gold, 912 ozs; yield per ton, 3.95 dwts. Profit for month, £5,611 6s 7d. Working Cost: Mining, 17s 1.79d per ton; milling, 2s 8.75d per ton; general charges, 1s 1.03d per ton; total, 20s 11.57d per ton: value of yield, 31s 11.59d per ton; profit, 11s 0.02d per ton. Cyanide working, 5s 8 81d per ton; value of yield, 11s 10.81d per ton; profit, 6s 2d per ton.

Princess.—Mine: Number of feet sunk and driven, 748. Mill: Number of days (24 hours) working 40 stamps, 25; ore milled, 4,178 tons; yield in smelted gold, 1,996.82 ozs; average per ton, 9 56 dwts. Cyanide Works: Tons of tailings treated, 2,426; yield (in bullion of 60s value), 510.8 ozs. Profit for month, £2,121 14s 8d. Working Costs, per ton: Mining, hauling and pumping, on 4,178 tons, 16s 7.8d; sorting and tramming, on 4,178 tons, 1s 6.9d; reduction, on 4,178 tons, 4s 1.3d; general charges, on 4,178 tons, 2s 5d—24s 9d; mine development redemption, on 4,178 tons, 6s 6d; cyanide works (on tonnage treated, 4s 3.5d), on 4,178 tons, 2s 5.9d—total, 33s 8 9d.

Crown Reef.—Profit of £15,557 8s 1d. Mine: Number of feet driven, sunk and risen, exclusive of stopes, 1,157½; quartz mined, 16,209 tons; quartz on hand, at surface, Sept. 30, 8,213 tons. Mill: Number of days (24 hours) working 120 stamps, 29 14-24; tons crushed, 16,298; tons crushed per stamp per 24 hours, 4.590; yield in smelted gold, 6,955 ozs 1 dwt; yield per ton, 8 dwts 12.836 grs. Cyanide Works: Tons sands and concentrates treated, 12,804; yield in smelted gold, 4,182 ozs 8 dwts; yield per ton, 6 dwts 12.791 grs; working cost per ton, 3s 4.140d; royalty cost per ton, 1s 3.266d; total cost per ton, 4s 7.406d. Slime Works: Tons slimes treated, 2,548; yield in smelted gold, 330 ozs 10 dwts; yield per ton, 2 dwts 14.260 grs.; working cost per ton, 6s 3.005d; royalty cost per ton, 3.286d; total cost per ton, 6s 6.291d. Total expenditure per ton, 27s 11.459d; value per ton, 47s 0.556d; profit per ton, 19s 1.097d. Development work done for the month, 1,157½ feet; the tonnage of ore

exposed by the development work amounts to 30,664 tons.

City and Suburban.—Profit for month, £11,114 0s 5d. Capital expenditure, £3,132 14s 8d. Total expenses per ton, 26s 0.5787d; value of yield per ton, 37s 4.7273d; profit per ton, 11s 4.1488d. Driving and sinking done during the month, 1,113 ft. 10 in.; ore developed during the month, 17,264 tons; estimated quantity of ore developed at Sept. 30, 387,717 tons. The milling results for the month are as follows: 160 stamps worked 24 days 8 hours 52 minutes; tons (2,000 lbs) crushed, 18,900; tons crushed per stamp per day, 4.847; yield in smelted gold, 6,142 ozs bullion; yield per ton by amalgamation, 6.4994 dwts bullion; assay value of tailings per ton, 4 754 dwts fine gold. The results by cyanide treatment for the month are as follows: Tons treated (2,000 lbs) at a cost of 4s 10.8667d per ton, 13,938; assay value of tailings per ton before treatment, 5.222 dwts fine gold; bullion produced (equal to 3,066.854 ozs fine gold), 3,825.95 ozs; yield of gold (in bullion) per ton treated by cyanide, 5.4898 dwts; yield of gold (fine gold) per ton treated by cyanide, 4.4006 dwts. Yield in fine gold per ton crushed—by amalgamation, 5.5940 dwts; by cyanide, 3.2453 dwts; by slags, 0.1396 dwts. Total yield in fine gold per ton from all sources, 8.9789 dwts.

Ferreira.—For quarter ending Sept. 30: Profit for quarter, £87,316 5s 4d. Capital expenditure, £15,181 4s 2d. Rock cut during the quarter, 2,120 feet. Mill: Ore crushed, 30,729 tons; ore crushed per head per day, 4.54 tons; bar gold extracted, 25,897.05 ozs; yield per ton, 16.855 dwts; concentrates caught, 714 tons; assay value of concentrates, 6 ozs 10 dwts 12 grs. Cyanide Works: Tailings treated, 27,173 tons; bullion produced, 10,345.30 ozs. Sorting: Waste rock picked out during the quarter, 17,811 tons. Dividend: Dividend No. 11 of 125 per cent (£112,500) has been paid during the quarter.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DECEMBER 8, 1896.

572,825.—AXLE BOX—McK. F. Bishop, Alameda, Cal.
572,858.—RAISIN SEEDER—S. B. Bliss, Pasadena, Cal.
572,859.—STRIKE PLATE FOR LOCKS—Rosalind H. Bower, S. F.
572,692.—NAILING MACHINE—J. A. Cavalli, S. F.
572,693.—LADDER—G. E. Chittenden, Niles, Cal.
572,745.—NUT—M. A. Clennam, S. F.
572,694.—RAILWAY RAIL JOINT—C. J. Cochran, Sisson, Cal.
572,874.—TROLLEY WAY—M. Dillenburg, S. F.
572,797.—GAS GENERATOR—J. E. Hatnaway, Santa Fe Springs, Cal.
572,769.—DREDGER—W. B. Pless, S. F.
572,734.—THILL COUPLING—Thompson & Edwards, Salinas, Cal.
572,735.—FASTENER—W. V. Thompson, Pasadena, Cal.
572,842.—IRRIGATING PLANT—A. W. Towne, Pomona, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

STRIKE PLATE FOR LOCKS.—R. H. Bower, San Francisco, Cal. No. 572,859. Dated December 8, 1896. This invention relates to an improvement in strike plates for mortise locks. It consists essentially of a plate to be secured to the door casing, having a slot formed longitudinally in it, having an outwardly projecting strike from one edge, said plate having the vertical side walls of its slot formed with tongues or grooves, a second plate fitted to slide within the slotted portion of the first-named plate and having its vertical edges correspondingly grooved or tongued to fit the edges of the first-named plate, and having independent openings, one for the latch and the other for the bolt of the lock, with a means for securing the slidable plate in its adjusted position. This allows the movable plate to be raised or lowered so as to keep the latch and bolt openings always in line with the latch and bolt and thus compensate for any variation which may be caused by the settling of any part of the house, which would ordinarily throw these parts out of line and necessitate a new arrangement by moving the strike plate.

NUTS.—Milton A. Clennam, San Francisco, Cal., assignor of one-fifth to Henry Sylvester, same place. No. 572,743. Dated December 8, 1896. This invention relates to an improved nut for use upon bolts. It consists essentially in forming a nut of a strip of metal made thickest at the center, tapering in each direction therefrom and coiled so that the thinner ends overlap upon the opposite sides of the thickened central portion of the nut blank. After being thus coiled the thread is cut in the central hole of the nut thus formed. This provides an elastic nut which in itself forms a lock to prevent its being shaken off, and as the nut blanks are formed from strips rolled of considerable length, which are cut off to the proper thickness the instant before the nut is formed, it leaves a bright surface of metal free from scale in which the thread is to be cut, and the greatest strength and depth of the nut blank is attained at the central point, which forms shoulders against which the ends of the coil abut and prevent the tendency to coil closer and bind upon the tool when the thread is being cut.

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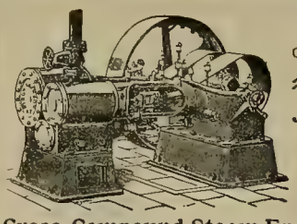
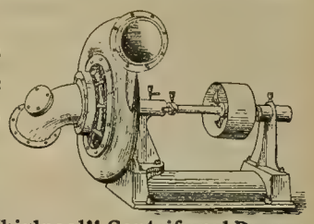


WRITE FOR CATALOGUE NO. 15.

Jackson's GAS —AND— OIL ENGINES.



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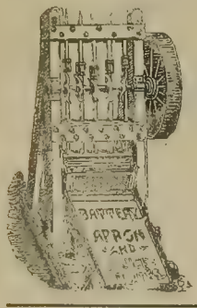

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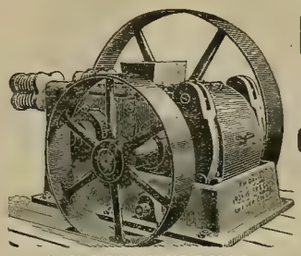

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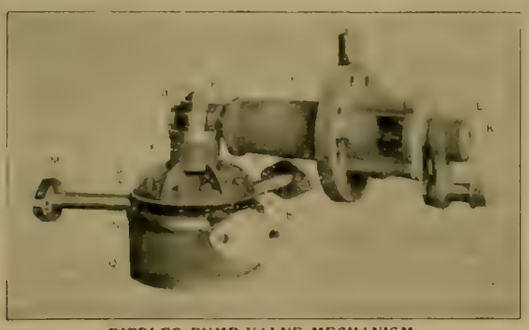

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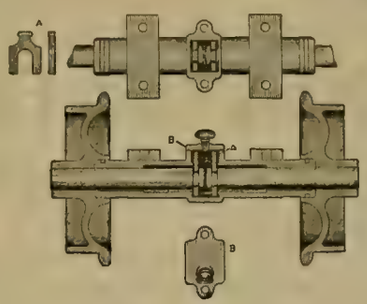

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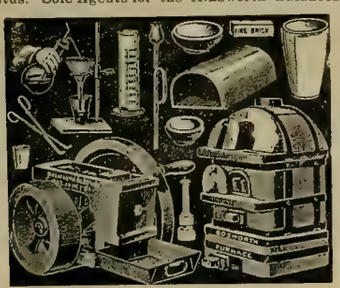

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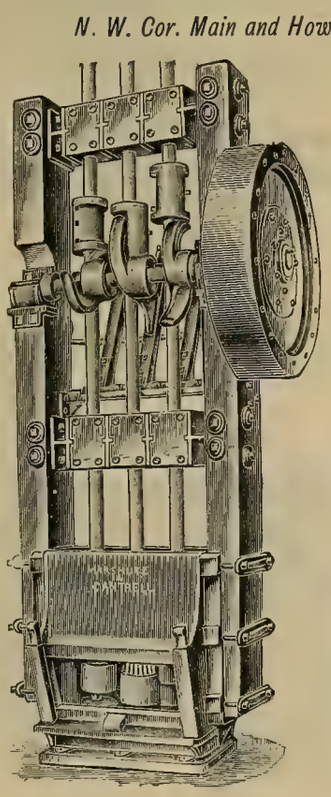

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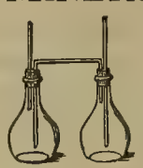

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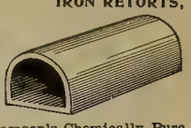

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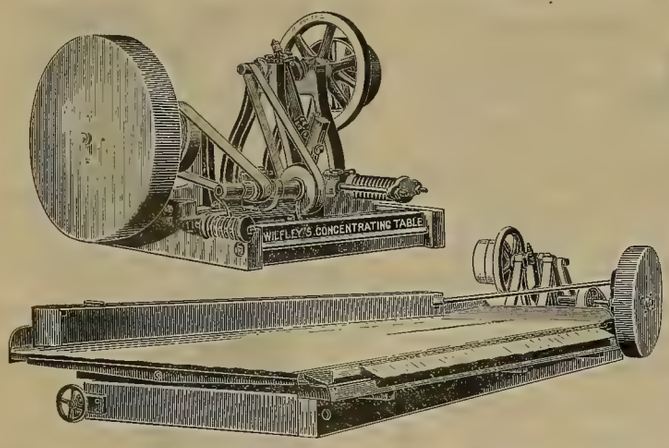

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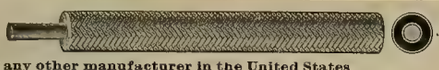

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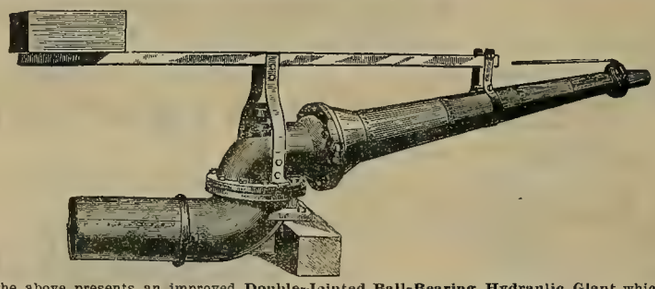

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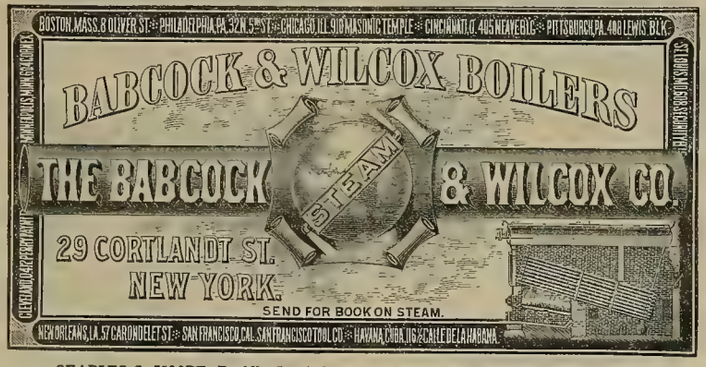
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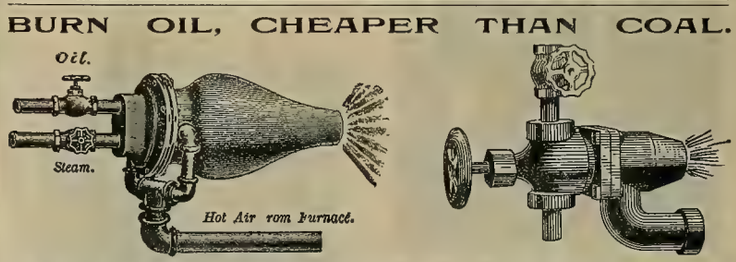
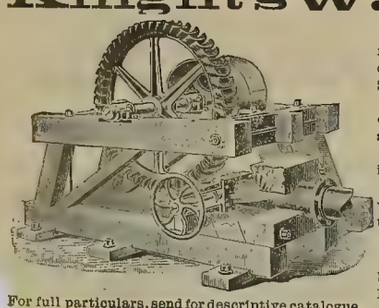


THE THURMAN FUEL OIL BURNER CO., When Building, INDIANAPOLIS, INDIANA. Designers, Contractors and Engineers for Complete Fuel Oil Equipment for Boilers, Furnaces, Ovens, Brick Kilns, Forges, Driers, Etc. **Acknowledged the Best. Absolutely Smokeless.** We Guarantee Our Burners To Be More Economical Than Any Other. Write For Catalogue and Prices.

Knight's Water Wheel.



For full particulars, send for descriptive catalogue.

The accompanying cut shows the general arrangement of **Knight's Standard Water Wheel**, of which there are **hundreds in use** in different States of the Union.

These Wheels are made from **2 feet to 6 feet in diameter, from 10 to 1000-horse power, and adapted to all heads and purposes.**

Wheels inclosed in iron cases, from 6 to 24 inches.

Wheels for electrical power can be furnished **with or without Governors. Highest regulation guaranteed.**

Address all communications to **KNIGHT & CO., Sutter Creek, Cal., or, RISDON IRON WORKS, Agents, San Francisco, Cal.**

DEWEY & CO.

AMERICAN AND FOREIGN PATENT SOLICITORS

ESTABLISHED 1860.

BRANCHES AT Washington, London, Paris, Berlin, Vienna, Melbourne, Etc.

No. 220 Market St.

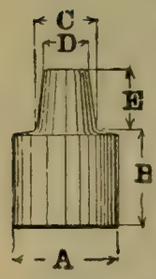
TAKE ELEVATOR No. 12, FRONT ST.

SAN FRANCISCO, CAL.

RISDON IRON WORKS,

Office and Works: Cor. Beale and Howard Streets, San Francisco, Cal.

MINERS, ATTENTION!



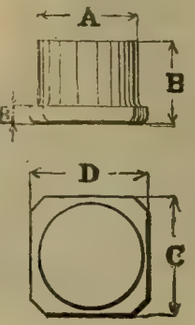
A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "

We beg to call attention to our "RISDON HAMMERED" Shoes and Dies, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



A=.....inches.
B=..... "
C=..... "
D=..... "
E= ..... "

When Writing please mention the MINING AND SCIENTIFIC PRESS.

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MINING AND MILLING MACHINERY,

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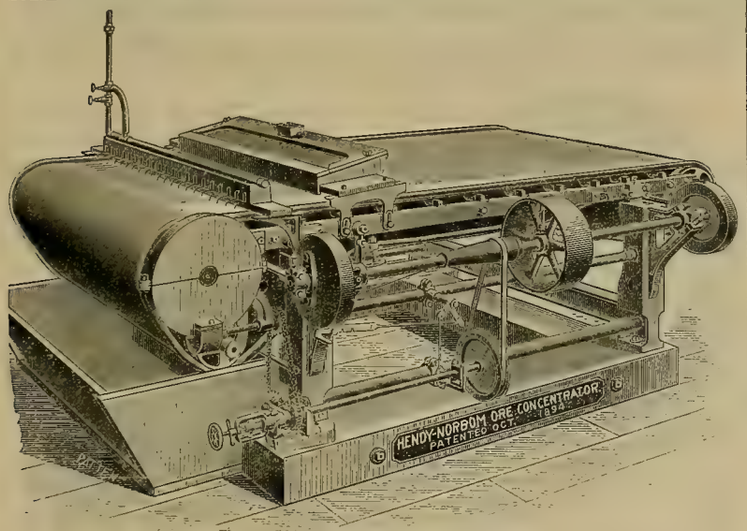

HENDY-NORBOM CONCENTRATOR.

Office of G. McM. Ross, Superintendent Webb Gold Mining Company,
Brown's Valley, Cal., September 14, 1896.

Mr. John O. Norbom—Dear Sir: I have been using your Concentrators at our mines in Brown's Valley and am pleased to inform you that they are in every respect thoroughly satisfactory. When erecting the plant at the above-named place we built Canvas plant, but since putting in your Concentrators we have but little use for that. The percentage of sulphurets now being handled is from 1½ to 2 per cent, mostly galena and iron pyrites, and crushed fine. We save from the pulp over your machine 98½ per cent, and it hardly pays for the labor on the Canvas plant. The motion given your Vanner by its delicately constructed curved springs renders it a perfect machine, and in my estimation it is but a short time before it will replace all other machines of a like nature now in use.

Yours very respectfully, F. W. Page, General Manager.

STAMP MILLS!

Triumph Concentrators,
Hendy-Norbom Concentrators,
Rock Breakers,
Hydraulic Mining Machinery,
Challenge Ore Feeders,
Steam Engines and Boilers,
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Water Wheels.

NOTICE TO ORE SHIPPERS.

By shipping your ores to us you can obtain the highest prices paid on competitive bids in the public market, together with a careful and accurate sample, as with our new mill and improved machinery we are able to give perfect satisfaction to all shippers. *Write for our Pocket Reference Book.* The highest cash price paid for gold bullion and old gold. Prompt returns.

STATE ORE SAMPLING COMPANY, Denver, Colo.

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—MANUFACTURERS OF—

Stamp Mills, Ore Feeders

DETACHABLE BUCKET WIRE-ROPE TRAMWAYS,

Roller Grinding Pans, Desulphurizing Furnaces, Etc.

Improved Self-Contained Cushion-Frame Five-Stamp Mill.
Patented in the United States and Foreign Countries.

The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Self-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill.

FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.

SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.

THIRD: The Large Amount of Space Saved.

Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.

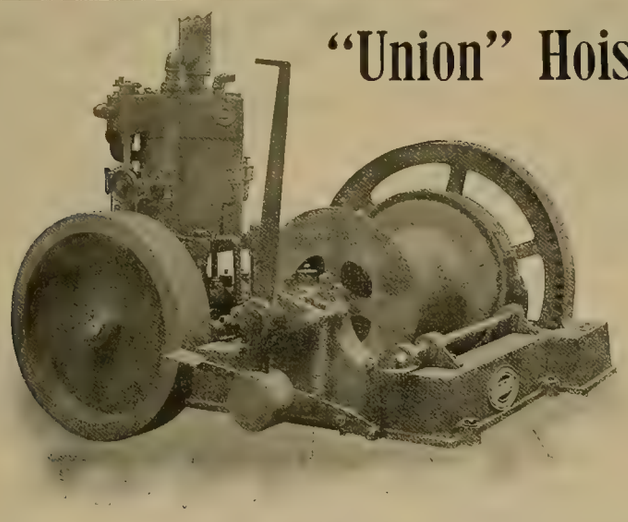
Send for Catalogue and Price List.

CORRESPONDENCE SOLICITED.

RUPTURE CURED.

Dr. J. C. Anthony, of 86 and 87 Chronicle Building, who for the past four years has met with universal success in the cure of Ruptures, now guarantees a cure in from 10 to 16 days. There is no pain, no blood drawn and absolutely without danger. Usually but a single treatment required.

"Union" Hoist.



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No Fire. No Steam. No Boiler. No Danger.

TEN YEARS' EXPERIENCE.

About Two Thousand Engines in Use.

Started instantly. Compact, strong, simple, efficient, economical. Perfectly governed, so that oil is used only in proportion to the work done. No expense when idle.

Particularly Adapted to Mining and Ship and Wharf Use.

SEND FOR CATALOGUE AND PRICES.

Union Gas Engine Company,
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Mining Machinery.

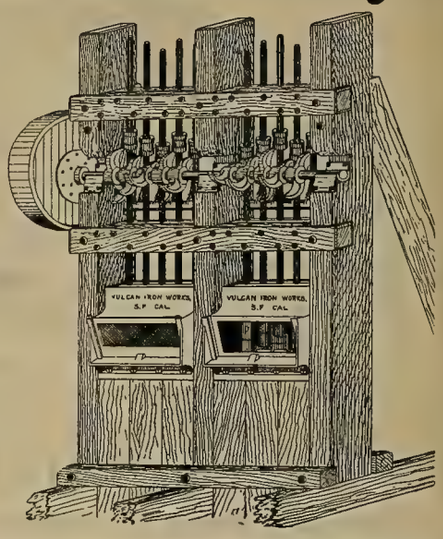
Stamp Mills

Of the Latest Improved Design for

Gold Milling.

VULCAN WIRE ROPEWAYS

For Conveying Ore, Etc.



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San Francisco, Cal.

IRON & STEEL WATER PIPE & WELL CASING

Mining Pipe

For Hydraulic Purposes, made from the Best Sheet Steel, Single or Double Riveted, Dipped or Undipped.

We will ship Pipe cut and punched, to be riveted at the mine, making a saving in freight charges.

WATER TANKS. OIL TANKS.
Steam Boilers, Ore Cars. Ore Buckets, Etc.,
SHEET IRON WORK OF ALL KINDS.
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A SUPERIOR ARTICLE AT A SMALL COST.

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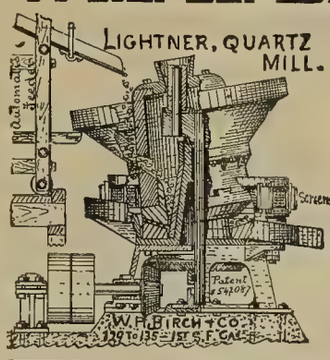

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2-Stamp Batteries, Self-Contained.
3- " " " "
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BRODIE'S ROCK CRUSHERS, SAFETY CAGES, MINING HOISTS, ORE CARS and BUCKETS.

All kinds of Mining Machinery.

Agents Sioux City Corliss Engines. { HIGH GRADE. LOW PRICE.

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TWENTY-SEVEN YEARS' CONTINUOUS SERVICE in the great Mines, Steamships, Railroads and Mills all over the world prove it to be

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ADAMANTINE SHOES AND DIES

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CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

STAMP SHOES.

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

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Special attention given to the purchase of Mine and Mill Supplies.

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H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.

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MANHATTAN RUBBER BELTING, PACKING AND HOSE,
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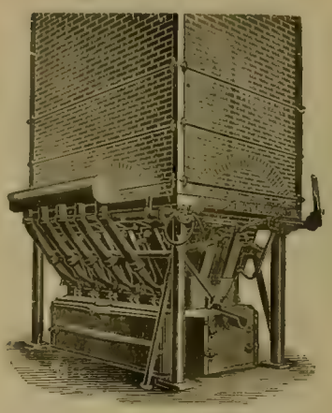
THIS TRAMWAY IS THE BEST THAT HAS EVER BEEN PLACED ON THE MARKET. IT HAS NO RIVAL. IT IS STRICTLY AUTOMATIC AND ITS CAPACITY RUNS UP TO 1000 LBS. PER BUCKET. ANY ONE CONTEMPLATING THE ERECTION OF A TRAMWAY SHOULD INVESTIGATE ITS MERITS BEFORE PURCHASING ELSEWHERE. . . . . .



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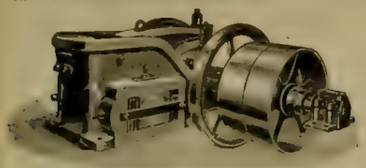
AMALGAMATION AND CONCENTRATION PLANTS.

Investigate Our Late Improvements in ORE CRUSHING MACHINERY.
We Guarantee Capacity Per Day to Any Degree of Fineness. . . . . .



Improved Black Hawk Ore Breaker.

OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.

Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

CONSOLIDATED Kansas City Smelting and Refining Co.

Incorporated Under The Laws of New York.

Capital paid in..... $2,700,000.

Buyers of All Classes of

GOLD, SILVER, LEAD AND COPPER ORES,

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GOLD BARS, SILVER BARS and MILL PRODUCTS.

SMELTING WORKS:
Argentine, Kas.; El Paso, Tex.; Leadville, Colo.

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We use the following Cipher Codes at our Argentine Works: A. B. C. Code: Moreing & Neal's Code and Bedford McNeill's Code.

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AGENCIES:
In United States—
Denver, Colo.
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Spokane, Wash.
New York City, N. Y.
Chicago, Ill.
St. Louis, Mo.
In Mexico—
San Luis Potosi,
City of Mexico
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J. E. Jackson, No. 6 Atlas Blk, Salt Lake, Utah.
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Established 1860.

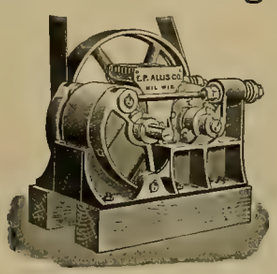
Mining, Milling and Smelting MACHINERY.

Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps, Compressors, Hoists, Boilers, Etc., Etc.

REYNOLDS CORLISS ENGINES.

Work the Best! Prices the Lowest!

The Reliance Crushing Rolls.



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BRANCH OFFICES:

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Salt Lake City, Utah.	73 So. Main Street.
Denver, Col.	427 Seventeenth Street.
Minneapolis, Minn.	427 Corn Exchange.
Chicago, Ill.	509 Home Ins. Building.
Kansas City, Mo.	43 Armour Building.
Pittsburg, Pa.	German National Bank Building.
New York City.	26 Cortlandt Street.
City of Mexico.	2a San Francisco No. 7.

Write for Our New Catalogue.

NOTICE TO GOLD MINERS!

SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

San Francisco Novelty and Plating Works

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☞ SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.

"Ferrite" and Projectile Steel Shoes and Dies.

Cheaper Than Cast Iron.

FOR FURTHER INFORMATION, ADDRESS

RIX COMPRESSED AIR MACHINERY COMPANY,

11 AND 13 FIRST STREET. SAN FRANCISCO, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 17, 1896.

For the close of the year general business has held up remarkably well. Although the buying is for filling in, still the volume of goods going out shows an increase over the corresponding time last year. There is a steady growing feeling of confidence in mercantile and manufacturing circles, due to the promising outlook for the gold mining industry and farm products. Up to December 1st the acreage prepared and seeded to wheat in California is estimated to have been from 20 to 30 per cent larger than the entire season of 1895-96. The ground, owing to cold weather, was mellow and well pulverized, only requiring soaking rains to make the plant take on a good and substantial growth. These needed rains came at an opportune time; and, with favorable weather from now to harvest, this State's outturn of wheat will be the largest on record. This means more farming machinery and a large increase in the number of farm hands. After the turn of the year this favorable condition will make itself felt with machine and farm-implement manufacturers.

The local money market maintains that easy tone heretofore reported in this department notwithstanding the withdrawal of funds usual to the closing month of the year. Considerable money is still being remitted to the East for the purpose of meeting maturing obligations in next month. The heaviest shippers are large incorporated companies that have to pay interest on bonds. This withdrawal is hardly felt owing to so much idle money coming out and the knowledge that in January large sums of money will be disbursed for dividends and maturing interest.

Eastern money markets continue to work on easy lines. At New York there is a steady accumulation of funds owing to hoarded money still coming out for investment and also the sending of funds by New England banks to that city so as to avail themselves of the 2 per cent interest allowed by some of the banks to depositors. A drop in the market prices for industrial and railroad securities at New York has brought about a lessened demand for accommodations from speculative operators. There is a continued absence of a demand for gold to be sent to Europe which has a favorable influence.

New York Silver Prices.

NEW YORK, Dec. 17.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.
Friday	30	65⅜
Saturday	30	65⅜
Monday	30	65⅜
Tuesday	30	65⅜
Wednesday	30	65⅜
Thursday	30	65⅜

	Copper.	Lead.	Iron.	Tin.
Friday	11 35	3 00	11 00@13 00	12 00
Saturday	11 35	3 00	11 00@13 00	12 00
Monday	11 35	3 02½	11 00@13 00	12 85
Tuesday	11 35	3 02½	11 00@13 00	12 85
Wednesday	11 35	3 02½	11 00@13 00	12 85

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	10c Prem
New York Telegraphic Transfer	12½c Prem
London Bankers' 60 days	$4.84¼
London Merchants	$4.83¾
London Sight Bankers	$4.87½
Refined Silver, per oz., 1000 fine	65¼
Mexican Dollars	51⅜@52½

SILVER.—The markets at home and abroad strengthened on last Friday and held to strong prices throughout the week. The advance to 65⅜c an ounce fine at New York and to 30s at London was due to a better demand from India in consequence of a firmer Indian money market with higher rates of discount, imparting more strength to the India exchange. This improvement made it possible to allot India council bills at an advance to 1s 13-32d per rupee. This goes far to show that the available supplies of silver bullion are not large either in Europe or America and that the least improvement in the demand meets with stronger prices. In our market there is a fair export inquiry. After the holidays it is thought that this will become more pronounced.

The exports of silver from England to India, China and the Straits from January 1st to November 26th were:

	1896.	1895.	Changes
To India	£4,235,278	£3,385,695	Inc. £849,583
To China	721,385	1,630,023	Dec. 908,638
To Straits	642,896	704,453	Dec. 61,557
Totals	£5,599,559	£5,720,171	Dec. £120,612

New York silver shipments from Nov. 27th to Dec. 9th were as follows:

Steamer New York, Dec. 9th, 446,000 ozs. Shipped by: Heidelbach, Ickelheimer & Co., 180,000 ounces; M. Guggenheim's Sons, 165,000; Fuller & Wilson, 60,000; Muller, Schall & Co., 25,000; Lewisohn Bros., 16,000.

Steamship Trave, Dec. 8th, 235,000 ounces and 15,000 Mexican dollars. Shipped by: Zimmerman & Forshay, 125,000 ounces; Fuller & Wilson, 60,000; Handy & Harman, 50,000 ozs. and 15,000 Mexican dollars.

Steamship Campania, Dec. 5th, 637,000 ozs. and 50,000 Mexican dollars. Shipped by: J. & W. Seligman & Co., 300,000 ounces; M. Guggenheim's Sons, 170,000: Handy & Harman, 75,000; Zimmerman & Forshay, 50,000 ounces and 50,000 Mexican dollars: Muller, Schall & Co., 25,000 ounces; Lewisohn Bros, 17,000 ozs.

Steamship St. Paul, Dec. 2nd, 300,000 ounces of silver and 15,000 Mexican dollars shipped by M. Guggenheim's Sons, 140,000 ounces; J. & W. Seligman & Co., 110,000, and Zimmerman & Forshay, 50,000 ounces and 15,000 Mexican dollars.

Steamship Havel, Dec. 1st, 390,000 ounces; Heidelbach, Ickelheimer & Co., 180,000 ounces; Handy & Harman, 100,000 ounces and 20,000 Mexican dollars; Zimmerman & Forshay, 75,000 ounces and 25,000 Mexican dollars; Fuller & Wilson, 35,000 ounces.

Steamship Etruria, Nov. 27, 683,000 ounces and 40,000 Mexican dollars shipped by Handy & Harman, 300,000 ounces and 15,000 Mexican dollars; J. & W. Seligman & Co., 160,000 ounces; M. Guggenheim's Sons, 120,000; Fuller & Wilson, 50,000; Zimmerman & Forshay, 30,000 and 25,000 Mexican dollars and Lewisohn Bros., 23,000 ounces.

MEXICAN DOLLARS.—The market is fairly firm with a good inquiry reported. Eastern advices report continued fair shipments abroad. London mail advices state that the demand was good, but supplies had not come forward very freely.

QUICKSILVER. — The market holds to steady prices.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

COPPER.—Our market is practically unchanged. At the East spot is quiet, but futures are strong. A New York correspondent, a recognized authority, writes: "The volume of business for the month of November was large, and we estimate the transactions in the aggregate at from 30,000,000 to 35,000,000 pounds of the various grades, including about 15,000,000 pounds sold by the Calumet & Hecla Company, most of the latter having been taken by home manufacturers. A noticeable feature has been the scarcity of casting copper and the high prices obtainable for this variety. The demand for casting brands has become so great that makers have been unable to meet it, and some consumers have bought largely of Lake copper as a substitute at about the same price quoted for casting. Much of the raw material hitherto available for smelters is now converted into electrolytic copper, for the sake of saving the silver contents, which has resulted in almost obliterating the output of casting copper. The market for this grade advanced as high as 11¼c for the best brands. There have been some purchases of foreign copper for American account, part of which has already arrived to meet this demand. With better trade in this country, consumption will undoubtedly improve greatly, and, in that event, exports should naturally show a material falling off next year, as it cannot be expected that the surplus available for shipment to Europe next year will equal that sent abroad during 1896.

Ingot, jobbing	14¼	@	—
Ingot, wholesale	13½	@	—
Sheet copper	17	@	—
Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c		
Lake Superior Sheathing	20		

LEAD.—In sympathy with the East the market is firmer. A speculative inquiry is reported at New York.

Pig	—	@	3 75
Bar	—	@	4 00
Sheet	—	@	5 25
Pipe	—	@	4 50

SHOT.—There is a good seasonable deanmd. Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

ANTIMONY.—Our market is quoted at 7½ @8c in a jobbing way. New York mail advices quote 7½c for Cookson's, 6½@6¾c for Hallett's and 6½c for Japanese.

BORAX.—The market is firm with producers not taking orders at quotations for less than carload lots.

The market is quoted as follows:

Refined, in car lots	5
Refined, in sacks	4¾
Powdered, in car lots	4¼
Concentrated, "	5

TIN.—There is nothing new to report either in our market or at the East.

Pig, per lb	14¼c	@	—
Plate, I C coke, heavy, per box	—	@	$4 05
" " " light, "	—	@	3 95

IRON.—Business in our market runs along on lines usual to the closing of the year. The demand for pig next year is expected to enlarge. At the East the markets are somewhat unsettled, owing to the uncertainty as to the steel billet pool. The output of furnacemen shows an increase. A late exchange says that there is a very large foreign demand for Alabama pig iron, amounting of late to about 20% less than the monthly capacity of the Tennessee Coal and Iron Co. The Atlanta, Georgia, *Journal* says that several mines and manufactories in Alabama have opened since election, and the most promising feature is the foreign demand for both Alabama and Tennessee iron. Present orders indicate that 1897 will be the banner year for exports of Southern pig iron.

AMERICAN.

	To Arrive.	Spot.
Sloss	$21 00	$23 50
Thomas	22 00	23 50
Salisbury	30 00	33 00

ENGLISH.

Barrow	$21 00	$23 00
Gartsherrie	21 50	23 00

POWDER.—There is nothing new to report. The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, " "	8½c

COAL.—The general situation is practically unchanged. Foreign shipments can only be made at late advances reported by us. The consumption in this State is only moderately good.

We quote as follows:

SPOT FROM YARD—PER TON.

Wellington	$7 50	@	8 00
Greta	6 00	@	6 50
Nanaimo	6 50	@	7 00
Gilman	5 50	@	6 00
Seattle	5 50	@	6 00
Coos Bay	—	@	5 00
Cannel	—	@	8 00
Egg, hard	12 00	@	13 00
Wallsend	—	@	6 50
Scotch Splint	—	@	—
Brymbo	—	@	—

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delin'g't and Sale.	Secretary.
Alta S M Co, Nev	54	5c	Dec 14	Jan 18 / Feb 8	J E Jacobus, 309 Montgomery
Bullion Con G M Co, Cal	10	10c	Nov 30	Jan 11 / Feb 10	C A Grow, Mills Bldg
Channel Bend M Co	5	2c	Nov 9	Dec 12 / Jan 2	J P Langhorne, 39 Sutter
Con Cal & Va M Co, Nev	7	25c	Dec 8	Jan 14 / Feb 4	A W Havens, 309 Montgomery
Crown Point G & S M Co, Nev	69	10c	Dec 9	Jan 13 / Feb 3	Jas Newlands, Mills Bldg
Eureka Con Drift M Co	5	5c	Nov 24	Dec 28 / Jan 18	D M Kent, 330 Pine
Exchequer M Co	39	5c	Nov 14	Dec 17 / Jan 11	Chas. E Elliott, Nevada Block
Gould & Curry S M Co, Nev	80	15c	Dec 14	Jan 19 / Feb 9	A K Durbrow, 309 Montgomery
Hale&Norcross S M Co, Nev	110	25c	Dec 8	Jan 11 / Feb 1	R U Collins, 331 Pine
Horsefly G M Co	1	25c	Nov 4	Dec 21 / Jan 20	R T Ward, 610 Clay
Horse Shoe Bar Con M Co	5	10c	Oct 29	Dec 5 / Dec 26	D M Kent, 330 Pine
Jamison M Co	9	5c	Nov 27	Jan 25 / Mar 22	Sam W Cheyney, 120 Sutter
Mt Diablo M & M Co	5	10c	Oct 27	Nov 30 / Dec 21	R W Heath, 318 Pine
North Gould & Curry, Nev	17	10c	Nov 4	Dec 5 / Dec 22	C H Mason, 337 California
Occidental Con M Co	25	15c	Nov 24	Dec 29 / Jan 18	A K Durbrow, 309 Montgomery
Overman S M Co	76	10c	Nov 28	Dec 31 / Jan 22	Geo D Edwards, 414 California
Reward G M Co	16	2c	Nov 11	Dec 14 / Dec 30	S W Backus, Mills Bldg
Silver King M Co	15	25c	Oct 26	Dec 7 / Jan 5	J W Pew, 310 Pine
Thorpe M Co, Cal	4	5c	Oct 14	Dec 22 / Jan 9	A F Frey, 567 Market
Ybarra G M Co, Lower Cal	6	10c	Dec 4	Jan 6 / Jan 25	Jas Coffin, 132 Market

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Gould & Curry S M Co, Nev	A K Durbrow, 69 Nevada Block	Dec 21
Thorpe M Co, Cal	A F Frey, 44 Phelan Bldg	Dec 30

COKE.—The market is quoted as follows:

Gas Companies'	—	@	—
English, to load	9 00	@	—
" spot, in bulk	9 00	@	10 00
" in sacks	11 00	@	12 00
Cumberland	—	@	—

LUMBER.—There is a continued heavy export movement from this city. The foreign clearances in November aggregate 4,284,789 feet, against 1,087,272 feet during the corresponding month in 1895. Of the shipments this year, Australia took 2,315,621 feet and Central America 1,104,269 feet.

Redwood, Fluming	17 00	@	—
Pine	14 00	@	19 00
Spruce	26 00	@	31 00

NAILS.— The market is essentially unchanged.

The market is quoted as follows:

Wire, carloads, basis per keg	
" jobbing, " "	$2 75
Cut, carloads, " "	
" jobbing, " "	2 50

Mining Share Market.

SAN FRANCISCO, Dec. 17, 1896.

The heavy and dull market reported last week continued to rule to Monday when a steadier feeling set in with Hale & Norcross developing strength. The firmness in the latter was brought about by some outside buying, and as the shares were in light supply an advancing tendency was easily established, which induces other buyers to come in when prices soon moved to over $1 a share. This improvement was felt by both Chollar and Potosi on reports that the south drift in the Brunswick workings improved towards Potosi. The true reason for buying Hale & Norcross is, as yet, somewhat of a mystery. There are several assigned, one is that those now in management fear they will loose control at the next election and are in the market as buyers of the shares, another is that the buyers believe that the Supreme Court will decide the lawsuit in favor of the company and still another that when active exploiting is down on the 1100-foot level, Comstock workings, good to high grade ore will be discovered. While one or all of the above reasons may prove correct yet to an outsider it looks as if there are some shorts on the shares due to the levying of a 25-cent assessment, the temporary stopping of work on the Comstock and that the company will, unless ore is found by the other companies working on the Brunswick lode, do no more work on the latter lode. The lawsuit will come up before the Supreme court either in January or February. The strength of the market and a sharp advance yesterday in the middle mine shares, shows it to be quite sensitive and speedily responds to buying orders. So far the movement does not look as if strong moneyed men are in the market, but it does show that there is a scarcity of shares. There is no doubt that values were driven to lower figures than the work in the mines both on the Brunswick and Comstock lodes warrant from a gambling point of view, but from an investment standpoint some were quite high enough. Quite a number of assessments are to be levied before long, including one on Chollar.

From the Brunswick lode our advices note fairly active exploiting in Occidental, with no particular change in the material run through. In Chollar they are still driving the two crossdrifts on the 400-foot level to the east. The south drift is being run so as to make it a crossdrift for the purpose of striking the downward continuation of the ore found above. In the Hale & Norcross shaft a station has been cut out on the 500-foot level, but it is hardly likely that a south drift will be commenced by Chollar until after Christmas. The company will have to run it at least 250 feet before it is possible to start crossdrifts. This will carry it well into February. Savage has stopped work on the 300-foot level and taken up the north drift run by Hale & Norcross to its line on the 400-foot level. The work on this level will be closely watched by mining men. The usual work is being done by Gould & Curry. Best & Belcher is running an east crossdrift at a point 152 feet from the boundary on the tunnel level.

From the Comstock lode our advices continue to report more or less work in the leading mines, but, from all that can be learned, not with the expectation of showing up ore. In Sierra Nevada they have stopped the east crossdrift in the Layton tunnel and resumed work in the west crossdrift. In Union they are still driving ahead, but slowly, also one of the lateral drifts on the 800-foot level and another from an upraise above this level. The west crossdrift on the 1000-foot Mexican level continues to pass through clay seams and lines of quartz. Similar formation is being passed through by Ophir's west crossdrift on the same level. On the Central tunnel Ophir is driving ahead two south drifts. One was, at last mail advices, in old fillings while the other was in low-grade quartz. In Andes they are running two crossdrifts. In Con. Virginia more active exploiting seems to be the order on the 1000-foot level. They are still raising from the east crossdrift on the 1650-foot level. Active lead and exploiting work is being done on the 1750-foot level. Only twenty-four tons of ore were extracted last week. The company milled 384 tons of ore, the battery assays averaged $30.15 per ton. Best & Belcher and Gould & Curry are still driving ahead the joint east crossdrift from the 800-foot level of the Bonner shaft. They do not get out of porphyry. In Savage the work is the same as reported last week. In Bullion they are still driving the north drift ahead. In Alpha the work is confined to the 500-foot level. The

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DIVIDEND NOTICE.

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For the half year ending with the 31st of December, 1896, a dividend has been declared at the rate per annum of four and two-tenths (4.2) per cent on Term Deposits and three and five-tenths (3.5) per cent on Ordinary Deposits, free of taxes, payable on and after Saturday, January 2, 1897.

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WM. B. ROOT,

Mining Exchange Building, DENVER, COLO.

work in Confidence, Challenge and Con. Imperial is the same as heretofore reported. Nothing comes to hand from Yellow Jacket. Fairly active work is being done by Crown Point on levels published last week. Belcher milled some ore which gave a bullion return of $89.69. They are still extracting a few tons of ore each week. In Overman they are working on the 900-foot level.

The following illustrates the changes of the week:

MINES.	Dec. 10.	Dec. 17.
Alpha	.....	.....
Alta Consolidated	$ 04	$ 04
Andes	11	14
Belcher	33	32
Best & Belcher	55	58
Bodie	.....	.....
Bullion	10	11
Challenge	25	.....
Chollar	95	90
Confidence	.....	75
Consolidated California and Virginia	1 10	1 15
Consolidated New York	.....	.....
Crown Point	18	20
Exchequer	.....	.....
Gould & Curry	31	35
Hale & Norcross	91	1 30
Justice	.....	.....
Mexican	42	47
Ophir	95	1 00
Overman	.....	05
Potosi	54	62
Savage	33	35
Sierra Nevada	39	46
Union	09	41
Utah	05	05
Yellow Jacket	27	.....

San Francisco Stock Board Sales.

SAN FRANCISCO, December 17, 1896.

9:30 A. M. SESSION.

200 Alta	04	200 Kentuck	02
300 Belcher	32	250 Mexican	47
100 Best & Belcher	58	700 Occidental	12
500 Bullion	11	350 Ophir	1 00
300 Chollar	90	200 Overman	05
250 Con Cal & Va	1 15	250 Potosi	62
400 Crown Point	20	1000 Savage	35
300 Gould & Curry	35	500 Sierra Nevada	46
400 H. & N	1 30		

SECOND SESSION—2:30 P. M.

450 Ophir	91	100 Belcher	31
200 Mexican	40	50 Confidence	75
1950 Gould & Curry	36	500 Sierra Nevada	41
500 Best & Belcher	54	100 Bullion	09
100 Con Cal & Va	1 05	600 Union	41
1400 Savage	30	200 Occidental	10
1100 Chollar	85	100 Andes	14
1200 Potosi	58	100 Utah	05
400 H. & N	1 15		

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ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Gould & Curry Silver Mining Company will be held at the office of the Company, Room No. 69, Nevada Block, No. 309 Montgomery street, San Francisco, California, on MONDAY, the 21st day of December, 1896, at the hour of 1 o'clock P. M. for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Friday, December 18, at 3 o'clock P. M.

ALFRED K. DURBROW, Secretary.

ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Thorpe Mining Company will be held at the office of the Company, Room No. 44, Phelan Building, San Francisco, California, on WEDNESDAY, the 30th day of December, 1896, at the hour of 1 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Monday, December 28th, at 3 o'clock P. M.

A. F. FREY, Secretary.

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Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star mining district, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 24th day of November, 1896, an assessment (No. 25) of fifteen (15) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 18th day of January, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Jamison Creek, near Johnsville, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 27th day of November, 1896, an assessment (No. 9) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of January, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 22nd day of March, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

SAM'L W. CHEYNEY, Secretary.

Office—Room 50, 120 Sutter street, San Francisco, California.

CON. CALIFORNIA AND VIRGINIA MINING Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 8th day of December, 1896, an assessment (No. 7), of 25 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of January, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 4th day of February, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, California.

HALE & NORCROSS SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, State of Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 8th day of December, 1896, an assessment (No. 110) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 3, No. 331 Pine street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on MONDAY, the 11th day of January, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 1st day of February, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

R. U. COLLINS, Secretary.

Office—Room 3, Stock Exchange building, No. 331 Pine street, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the 14th day of December, 1896, an assessment (No. 80) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th day of January, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on TUESDAY, the 9th day of February, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Trustees.

ALFRED K. DURBROW, Secretary.

Office—Room 69, Nevada Block, 309 Montgomery St., San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 14th day of October, 1896, an assessment (No. 4) of 5 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 567 Market street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of December, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 9th day of January, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. FREY, Secretary.

Office—No. 567 Market street, San Francisco, California.

POSTPONEMENT.

The date of the delinquency of the above assessment is hereby postponed to the 22nd day of December, 1896, by order of the Board of Directors.

A. F. FREY, Secretary.

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THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from C. W. & W. W. Martin, in the North Star mine, near Placerville, El Dorado Co., to deposit tailings in White Rock Creek; from Stevens, McKenney & Co., in the Boulder Hill mine, near Placerville, El Dorado Co., to deposit tailings in Ringold creek; from Au Sing, in the Hayden Hill mine, at Green Valley, Placer Co., to deposit tailings in an old pit; from George W. Jones, in the Buckeye Hill mine, near Nevada City, Nevada Co., to deposit tailings in a ravine; and from A. H. Holgate and others, in the Golden Gate mine, near Union Valley, Plumas Co., to deposit tailings in Winter's creek, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on December 21, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from C. E. Beaver, in the Union mine, near Brownsville, Yuba county, to deposit tailings in a ravine below the mine; from C. P. Saxton, in the Saxton mine, near Genesee, Plumas county, to deposit tailings in Little Grizzley creek; from O. D. Campbell, in the Sailor Flat mine, near Blue Tent, Nevada county, to deposit tailings in Sailor Flat canyon; from W. H. De Mott, in the Blue Tent mine, near Blue Tent, Nevada county, to deposit tailings in an old pit; from Mathias Diehl, in the Frank Milan claim, near Camptonville, Yuba county, to deposit tailings in Mill creek; from R. M. Cunningham and Thomas Phillips, in the Montre placer mine, near Pike City, Sierra county, to deposit tailings in a ravine below the mine; from Cy. Mulkey, in the Cedar Creek Consolidated mines, near Fair Play, El Dorado county, to deposit tailings in Cedar creek; and from Al. Petty, in the Lucot mine, near Volcano, Amador county, to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on January 4th, 1897, at 1:30 P. M.

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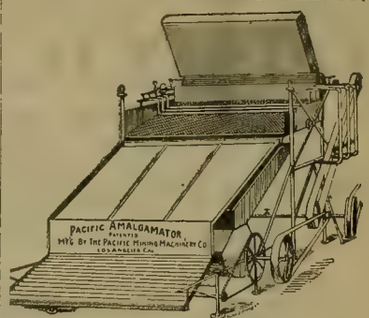

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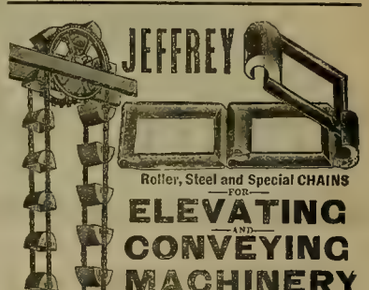

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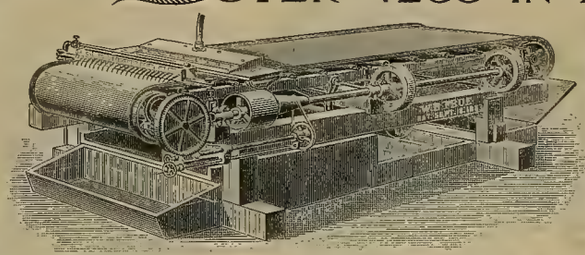

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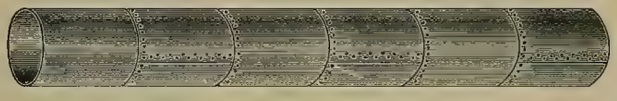

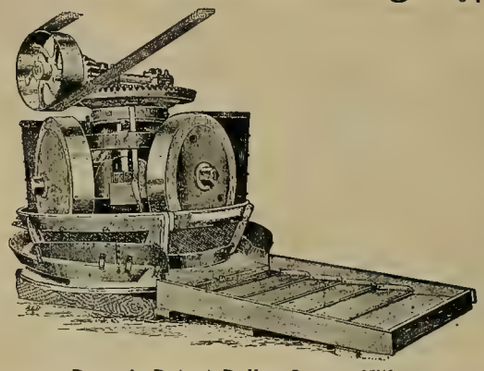

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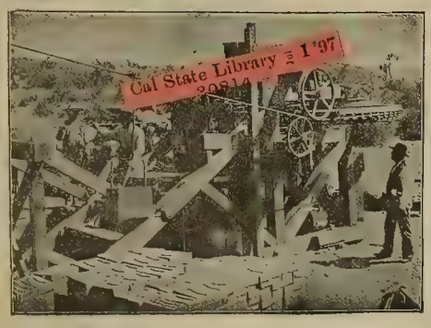
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MINING AND SCIENTIFIC PRESS.

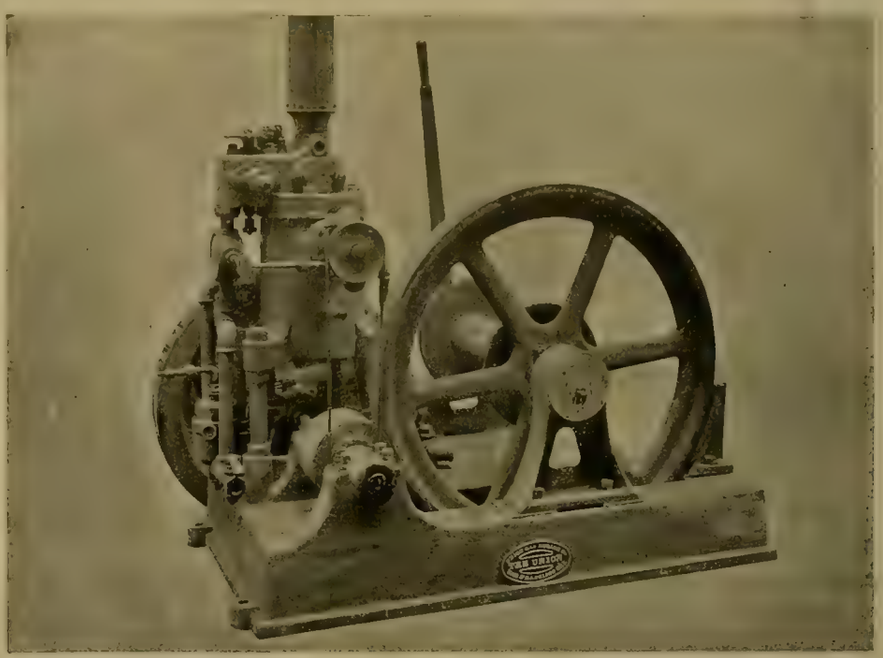
AND PACIFIC ELECTRICAL REVIEW.

No. 1903.—VOLUME LXXIII. Number 26. SAN FRANCISCO, SATURDAY, DECEMBER 26, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

For Mine and Marine Work.

On this page are illustrations of two devices manufactured by the Union Gas Engine Co. of this city. The upper one shows a 4-H. P. single drum prospecting hoist, driven by friction. Its builders say it can be operated on gasoline, benzine, distillate or kerosene. The quantity of fuel used depends upon the amount of work being done. Hoisting is intermittent work and a sensitive governor becomes indispensable for economical working. This hoist is equipped with such a governor. It will lift 1000 pounds 100 ft. per minute.

The lower cut represents an oil engine with hoist and windlass combined on iron base. This outfit is intended to meet all the wants in the line of hoisting of 50 or 60-ton vessels. The engine is 4-H. P., fitted to run on gasoline, benzine, distillate or kerosene. The cargo drum runs thirty-seven revolutions per minute, capable of lifting 1000 pounds 100 ft. per minute; the windlass running eight revolutions per minute can lift 6000 pounds 16 ft. per minute. The shaft carrying cargo drum also has a gypsey which runs at same speed as the drum and is intended for hoisting sails or cargo. The windlass has a gypsey on each end for hoisting heavy cargoes and warping ship, and two wildcats for hoisting anchors. When the windlass is not in use it can be thrown out of gear by a small lever—shown in the cut. It is all made for hard work and occupies a space of 4x5 ft.

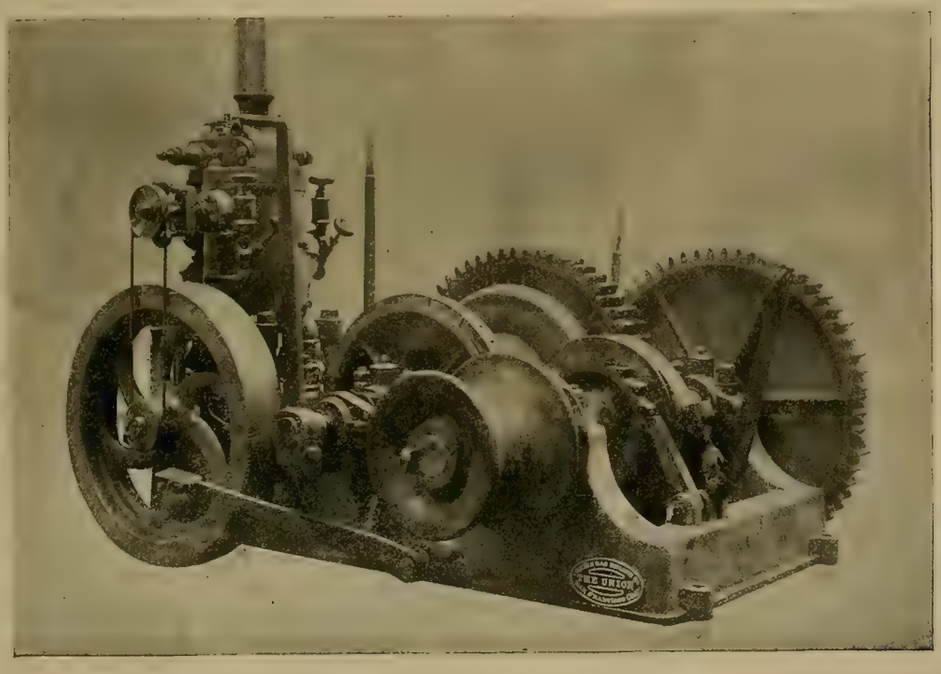


FOUR HORSE POWER SINGLE DRUM PROSPECTING ENGINE.

Careless Milling.

No one can look about through the mills of California without being struck with the excellence and merit of some and the shocking deficiencies of methods and practice in others. The majority of the millmen have grown old in the service. From a variety of reasons it happens that many mine managers have neither theoretical nor practical knowledge of milling, and trust implicitly in the revered wisdom of their millman. Henry Louis, in the preface to his work, says: "It is not too much to say that not one manager in ten knows how much gold he is losing in the mill. What he is getting is really a secondary question, and this, the fault in the first instance of an imperfectly trained millman, renders it impossible to detect the shortcomings of the latter, whose very incapacity thus serves as its own shield." And so it comes about that the State which taught the world how to mill gold ore, and which contains to-day perhaps the most instructive examples to be found of its practice, still moves so largely in the ruts of a bygone time and allows much of the gold drawn from its veins to run to waste in its gulches and rivers. Experience has taught how easy it always is to lose gold, how difficult sometimes to save it. One often meets some self-complacent director who tells how ridiculously little gold there is in the tailings from their mill, and how they do not need any assayer, for their foreman, or superintendent, or millman, or some other venerable prodigy always tests everything in the pan, at which the experience of forty years has taught him a superhuman cunning.

The cause of the failure of many mining enterprises in all parts of the world have been from losses of this kind. A careful examination of a property and estimate of cost may be made that will show that it will pay a certain profit. The costs may bear out the correctness of the estimates and the assays of the ore taken out may show that the report on the ore bodies was correct, yet leaks will creep in that make the difference between a profit and a loss.



OIL ENGINE WITH HOIST AND WINDLASS COMBINED.

The Railroad's Methods.

According to reports from different parts of the State as to the work being done by the Southern Pacific Company in its haste to forestall the effects of the proposed Mineral Land Bill now before Congress, they are not over-particular about using the fairest means. Near Oro Fino, in Siskiyou county, some of the notices calling upon the owners of mines that have been worked for years to appear at Redding and show cause why the sections upon which they were posted should not be patented to the Southern Pacific Company, were put up on trees some distance from the road out on the side of the trees furthest from it. The law states that these notices shall be posted in conspicuous places.

MINING AND SCIENTIFIC PRESS.

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J. F. HALLORAN.....General Manager

San Francisco, December 26, 1896.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Four Horse Power Single Drum Prospecting Engine; Oil Engine with Hoist and Windlass Combined, 517. Single Round Bowl Slag Truck, Capacity 35.18 Cu. Ft.; Method of Dumping Round Bowl Truck; Single Elliptical Bowl Slag Truck, Capacity 34.7 Cu. Ft.; Method of Dumping Elliptical Bowl Truck, 525.

EDITORIAL.—For Mine and Marine Work; Careless Milling; The Railroad's Methods, 517. Mines and Mining; Australia and Cyanide Patents; The Proposed Laws as to Mining Locations; New System for Swindling Investors, 518.

SCIENTIFIC PROGRESS.—Imitation in Nature; Machinery vs. Brains; Rails of Wood Pulp; A Fact Which Upsets Some Old Ideas; Alcoholic Drinks Upon Digestion; Change of Air; Height of Mt. Rainier, 524.

ELECTRICAL PROGRESS.—Scientific Wild-Goose Chase; A Revolt Against the English Trunk Telephone Lines; Electrically Heated Sadirons; A New Syndicate in Chicago; A New Departure in Railroading; Telephone Users Hear Better with the Left Ear; Paris to Have a Trolley Line; Submarine Cable, 524.

MECHANICAL PROGRESS.—Disposing of Slag at Smelting Plants; Aerostatic Railway; Firing a Cannon under Water; Motor Carriage Race; American Invention Machinery, 525.

PRACTICAL INFORMATION.—Pneumatic Power in Workshops; An Important Feature in the Mechanical World; Automatic Signals to a Locomotive; Plate Glass; "Papyrolith;" An Iron Ship, 528.

MINING SUMMARY.—From the Various Counties of California, Nevada and Other Pacific Coast States and Territories, 526-7.

THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Assessments, etc., 538-9.

MISCELLANEOUS.—Concentrates, 419. The Solution and Precipitation of the Cyanide of Gold, 520. Some Points on Prospecting; A "Mother Lode" in the Cascade Mountains; A Proposed Two-Mile Shaft; Some of Nevada County's Mines, 521. Nevada City District Geology; The Rand Mining District; Placer Gold Mining in Eastern Oregon, 522. Costs of Milling and Mining; Mining Prospects in Wyoming; About Saving Gold in the Mills at the Rand, South Africa; Alameda County Miners' Association, 523. Gold in Nevada, 528. Coast Industrial Notes; Recently Declared Mining Dividends; Recent California Mining Incorporations; Personal; Commercial Paragraphs, 530. List of U. S. Patents for Pacific Coast Inventors; Notices of Recent Patents, 534. Index to Volume LXXIII, 539-540.

THERE were 20,630 papers described in the issue of the American Newspaper Directory for 1896. Of these, 17,650 are credited with issuing less than 1000 copies each. Of the remaining 2,980, but one mining paper published its exact circulation in plain figures. That one was the MINING AND SCIENTIFIC PRESS. These facts (which are furnished by the proprietors of the American Newspaper Directory) are commended to the attention of intelligent advertisers, who want their business announcements read by customers, instead of competitors.

Australia and Cyanide Patents.

The Australian governments take a very paternal interest in the development of mining. The colony of New South Wales offers a reward of £500 for the discovery of any new gold field. A bill has been drafted by the Minister of Mines of Victoria providing for the expenditure of £140,000 to assist in the development of mining. The money is to be expended in sinking shafts and other such work provided that the companies receiving assistance expend as much. In all the colonies are departments of the Government whose business it is to look out for the industry.

In a late issue the Australian *Mining Standard* calls upon the Government of Victoria to follow an example set by New Zealand and take steps to determine the question of novelty or no novelty in the MacArthur-Forrest cyanide patent and not to leave that to be fought out by private individuals. Considering that the patents have been granted by the governments named to the MacArthur-Forrest people this would hardly seem fair. Some consideration, too, should be given to them for the good work done in introducing a process that has saved those countries millions in gold. In those countries, however, patents are granted upon application without examination as to their novelty and without guarantee of novelty. So in England and France where all patents must be labeled "Without Guarantee of the Government."

In the United States patents are not granted until careful examination has been made as to novelty in the Patent Office. This does not mean that this Government guarantees the novelty of the inventions, but it is a precaution that saves the public at large much money that would otherwise be paid for patents on old discoveries and largely reduces the number of lawsuits in regard to inventions.

A New System for Swindling Investors.

In the issue of the MINING AND SCIENTIFIC PRESS of December 12th mention was made of a novel method for raising capital for mining ventures, which was characterized as a scheme for robbing the unwary. It was described as follows: "A Western mining company wanted $40,000 to develop its plant. To obtain this it issued stock for $200,000, on which a dividend of 8 per cent was guaranteed for ten years. The guarantee was made through a Chicago bank, the stock being sold at par. The bank held 80 per cent of the amount received for stock, or in all $160,000, remitting to its client — the mining company—the $40,000 required for the development of the mine. In this manner the annual guaranteed dividends were assured of payment. The mining company received the value it had placed on its shares, the subscribers were protected against loss of more than 20 per cent of their investment, with the possibility of a proportionate share of the profits if the venture turned out well; and the bank making the deal had the advantage of the use of the money during the ten years the guarantee remained in force." That was the way in which the scheme was described in a number of newspapers that come to us. It seemed such a palpable swindle that it was characterized as such in these columns. Now a letter has been received from Chicago which is as follows:

In your issue of Dec. 12th, 1896, page 479, middle column, second item from the bottom, referring to a scheme for robbing investors, lately being worked in Chicago as a mining investment, etc., if a mining company have a property requiring development, and which, with the development, can be made a good dividend-paying property, and if such a company has among its officers men of standing in the community, and if the bank which guarantees the dividends as referred to in your article, and the money raised for the treasury is honestly and judiciously expended in the development of the property, will you kindly inform me in what way this could be really called an illegitimate mining proposition?

As a matter of fact, there is only one way in which the proposition could be looked upon as illegitimate, and that is in the event of the company making this offer being a dishonest one and intending to appropriate their portion of the money raised for their personal use. Otherwise it strikes me as being a very reasonable proposition, as the investor cannot lose more than 20 per cent of his original investment besides the interest. There are many properties that $40,000 would not put on a paying basis.

I write this frankly and candidly to you, not that I am interested in such a proposition, but I had heard of a similar proposition, and personally knew that the bank which guaranteed these payments was a well-known institution of this city, which could ill afford to lend its name to any scheme, no matter how meritorious it might appear to be on paper, if they were not perfectly satisfied that it was a worthy proposition and in the hands of good people.

It is possible that there may be some good reason for referring to such a scheme in the manner you did. If so, I would like to know very much what it is.

I will greatly appreciate your reply.

Yours truly, HONEST ENQUIRER.

If there is any way of explaining that this scheme is not a swindle we should like to know it.

Of course it may be claimed that the investors have a chance to make something out of the mine, but if so why not ask for $40,000 only and let them put their $160,000 in savings banks or invest it in other mines.

The whole proposition boiled down means this: A has a mine worth nothing. B gives to C $200,000, of which $40,000 is to be paid to A to be used in prospecting. The rest, $160,000, is to be paid back to B at the rate of $16,000 a year.

A capital of $200,000 is raised, but only $40,000 goes into the mine. Is the mine worth nothing but prospecting? If so the $200,000 capitalization is a swindle.

Those who put up the $200,000 lose the interest on $160,000 and probably absolutely lose the $40,000. The bank handles the money simply and has the use of it for the time. The mine owner will probably make something out of the $40,000, but it seems a pity that one who could take in people in such a scheme should be content with the meagre pickings out of $40,000.

Truly, any way it may be looked at, it is such a bold swindle that it seems impossible that Chicago people could be taken in by it.

The Proposed Laws as to Mining Locations.

The proposed laws offered in November by the MINING AND SCIENTIFIC PRESS for adoption by the California Legislature have called the attention of mining men in other States and Territories to needs for reform in their laws. In the Black Hills it is proposed to have laws passed compelling all locators to sink 10 feet, or run drift that will be equivalent, and to have claims surveyed by United States deputy mineral surveyors. These points were suggested by the laws we proposed, and the fact that miners in other parts of the West ask for legislation on the same lines, is as strong an argument as can be presented in their favor.

In this connection a correspondent of the Black Hills *Mining Review* writes:

As the law now stands, there is no limit to the number of claims a person can locate and hold for a period of two years at a cost of $1 each. When the two years have expired, the ground is relocated at the same cost as before, and held for two years more, and the same process can be continued indefinitely. There are hundreds of fair prospecting claims in Custer and Pennington counties that have been held by the same individuals for ten or fifteen years, and in some cases for a longer time, and in many instances not $5 worth of work has been done. Were these individuals compelled to do a reasonable amount of work, and have their claims surveyed before a record could be made, there would be from ten to fifteen thousand claims in Pennington and Custer counties opened up to men who would develop them. At the present time the Harney Peak Tin Company is holding something like 1000 claims by the relocation and leadpencil process. Their plan of operation is as follows: A few days before the first of January each year, they hire a few men to go on their claims, throw out a few shovelfuls of dirt, and freshen up the old workings, and when the first of the year comes around they relocate. There are many individuals in Pennington and Custer counties who have from ten to 100 and more claims each. If these claims were thrown open to the public, nearly all of them would be prospected, and very probably many good finds would be made.

Another advantage in having a law of this kind would be to reduce the number of lawsuits to the minimum. A great many people have often wondered why we never have any stampedes in the Hills as other mining countries have. The reason is, Tom Jones makes a good find, locates say a group of ten claims, he then informs his friends, Smith, Brown, Johnson and Ole Olson; each of them take from five to twenty claims, and by the time the public learns of Jones' find every piece of ground within three miles of it is taken up. Of course no prospector will go on another man's ground to prospect; the people who own the ground have too much ground to prospect it as it should be done, therefore three-fourths of the mining ground of the Black Hills is unprospected, and will remain so as long as the law remains as it is. If the laws were changed as proposed there would be thousands of miners at work in the Black Hills where there are now hundreds.

Mines and Railroads.

Much of Colorado's great mineral wealth would not have been developed but for the railroads which have been run into the new districts. The fact that most of the ores are refractory has made railroads a necessity in order to bring the products of the mines to the smelters. In British Columbia railroads are being rapidly built into the mining districts. One result of this will be the working of ores of a grade too low to be worked at the present time owing to the cost of transportation.

Both Colorado and British Columbia are fortunate in having the advantages of railway competition. California and Nevada are not as well favored in this respect. The Southern Pacific has not only refrained from building branches, but has done all in its power to prevent others, and has generally been successful. Now a stimulus seems to have been given to the building of roads into comparatively undeveloped districts for the trade that may be secured in time.

This will mean a great deal to both States and especially to Nevada. In connection with the Sierra Pacific Railroad projected to run out of Stockton into the mining country along the mother lode it is proposed to run electric roads between some of the mining towns and as feeders to the steam road. There are other parts of California that could take advantage of the abundance of available water power to build the electric road to the main lines of railway and secure low rates of transportation.

Concentrates.

A NEWSPAPER has been started at Randsburg—the Randsburg *Miner*.

A NUGGET worth $1,000 was found last week in the placers at Osceola, Nevada.

THE town of Kaslo, B. C., will be lighted by electricity by the first of the new year.

To date, the Centennial-Eureka mine, Tintic, Utah, has paid dividends aggregating $1,920,000.

THERE is proposed a duty on silver to amount to the difference between the market and mint prices.

THERE is reported a discovery of a mineral paint mine in the Temescal mountains in San Bernardino, Cal.

THE newly formed Spokane, Wash., Stock Exchange expects to be ready for business by the first of the new year.

ON pages 522 and 526 of this issue the new camp of Randsburg is reported from the standpoint of a practical miner.

AT the Banner mine in Butte county, Cal., new machinery to cost $50,000 will be put in soon to more fully develop the property.

A COUNT of tents and buildings in Randsburg, Kern county, last week, showed 280, and an estimate of population placed it at 1150.

A PROSPECTUS published in London asks for purchasers for shares in the Vulture mine, of Arizona, capitalized for $1,800,000.

B. A. CARDWELL, who has bonded several mines in Meadow Lake, Cal., district, proposes to build a wagon road to the railroad at Truckee.

THE town of Columbia, Tuolumne county, will in a few days be lighted up by electricity from the Electric Light and Power Company's plant.

A CLEANUP in a placer claim near Johnstown, Lyon county, Nevada, the work of three men 16 days, yielded $365, or nearly $8 a day to the man.

AT Taylor & Crow's mine, in Galice creek, Southern Oregon, four men can mortar out from the richer rock $500 to $600 a day, according to a local paper.

THE Tuolumne Power Company has shipped in supplies and begun work at Jacksonville, Cal., on a ditch to divert the waters of the Tuolumne river for power purposes.

THE Victorian Gold Estates, Limited, of London, has a concession from the Australian colony of the same name of 9000 acres of gravel mining property in the Ballarat district.

A MINING company has been organized at Marlow, Oklahoma, with a capital of $500,000 to work lately discovered gold mines on Otter Creek on the north side of the Wichita mountains.

NORTHERN GEORGIA claims that '97 will show a great gold development therein. Georgians assert that all needed there are plenty captail and modern methods of treating the ore.

THE Union Hill Mill and Mining Company, of the Black Hills, South Dakota, has let contracts for the erection of a smelting plant of 200 tons daily capacity, that will cost nearly $300,000.

QUIGLEY & MULLEN, wholesale grocers of Wilmington, Del., have failed for $71,000, through financial difficulties caused by the troubles of the Golden Scepter Mining Company, at Granite, Montana.

AN English syndicate is reported to be considering the purchase of the De Moon ground, above North Bloomfield, Cal., adjoining the old Derbec. It is proposed to run a long tunnel to tap the gravel.

A DISPATCH from Seattle, Wash., announces that Dennis Ryan, a capitalist of St. Paul, and associates, have purchased for $250,000 a controlling interest in the Bonanza mine, in the Silverton district.

THE heavy and early rains are helping out the hydraulic miners in the northern counties of the State and giving them a long season's run. This promises a large output of gold from Siskiyou and Trinity.

THE various cyanide plants on the Rand in South Africa have a gross capacity for treating over 20,000 tons of slimes per month and they have on hand tailings, slimes, etc., amounting to over 1,500,000 tons.

DURING the past few weeks the number of affidavits as to labor performed on mineral locations that have been filed has far exceeded the number of location notices. The first week in January will reverse this.

COAL from the recent discovery south of Columbus, Esmeralda county, Nevada, is being used for domestic purposes and proves to be of good quality. Investigations tend to show that the deposits are large.

A CONTRACT has been let at Nevada City to sink an incline 500 feet in the Millikin Ranch mine at the rate of $2.35 per foot. The incline is already down 110 feet. The ground to be run through is earth and gravel.

"THE inventor of the chlorination process," is reported by local papers to be visiting Cripple Creek, Colo. This is a little hard on the memory of Prof. Plattner and the late Mr. Deetken of Auburn, Cal.

ENGLISH capitalists have put men at work prospecting the Adelaide copper mine near Golconda, Nevada, to determine its value. If expectations are realized, it is expected that there will soon be 300 men employed.

THE Anaconda company owns over 100 locations at Butte, Montana, and has expended over $80,000,000 since 1881. An average of 2500 men are employed. The output of copper for 1896 is estimated at 130,000,000 pounds.

IN Montana the Northern Pacific is patenting a large amount of mineral land. Owing to a neglect on the part of the people, the spirit of the law under which the Commissioners were appointed is not being carried out.

THE educational institutions of Montana hold 9,000 square miles of land. The minimum price at which these lands may be sold is $10 per acre. None of the principal from the sale of these lands may be expended but only the interest used.

WHILE excavating for a tunnel on the Alum Rock Railway, seven miles from San Jose, several small veins of coal were discovered last week, and it is probable that borings will be made to discover, if possible, if larger bodies do not lie further down.

THE mines of British Columbia have made a large output of bullion during the past year. Most of it comes from high-grade ores, the only class that will pay the heavy costs of mining and shipping. There remain untouched immensely larger bodies of lower grade ores that will in time be worked as the costs are reduced. That the gold, under the circumstances, has been so large gives promise of a splendid future for these mines.

H. S. GILLETTE and Calvin I. Brown have purchased five mines in the Beveridge district, near Independence, Inyo county, Cal., and will erect a mill. The ores are high grade, but have heretofore been packed out on mules at a cost of $12 a ton.

THE Enterprise group of mines on Ten Mile creek in the Slocan, B. C., have been bonded to D. M. Hyman and others of Colorado for $300,000. The first payment of $50,000 has been paid, $100,000 is to be paid on May 1, and the balance, $150,000, to be paid on July 1.

THE Bonanza mine in the Baker City district, Oregon, was offered a short time ago for $15,000. The owners, however, erected a mill on it, made a twenty days run and cleaned up $15,000 and now state that they have in sight 300,000 tons of ore that will mill over $10.

GOVERNOR FRANKLIN, of Arizona, places the value of the mineral output, gold, silver, lead, copper and limestone, of that territory for the last fiscal year at $13,978,233.20. Considering that the territory has a population of less than 100,000, a large proportion of which is engaged in other industries, this is a very good showing.

NUMEROUS comments and suggestions are received regarding the proposed Cabinet Secretaryship of Mines. The Santa Fe *New Mexican* proposes that the present Department of Agriculture be abolished, and in place thereof a Department of Industry be created, with Bureaus of Agriculture and Mining and Manufacturing.

THE Mammoth mine at Tintic, Utah, which has paid in dividends $1,150,000, has attracted the attention of foreign investors a number of times of late and now it is reported in Salt Lake that a controlling interest has been placed in escrow to be delivered on payment of $5 per share, or at the rate of $2,000,000 for the whole property, to a European syndicate.

IN Western Australia under the laws of the colony the holder of a mineral lease from the Government is bound to keep at least one man at work on each three acres included in the lease. Although a large number of miners have gone to the colony during the past two years, so many of them are prospecting or locating claims on their own account, that it is difficult for the leaseholders to find men to do the necessary work.

THE engineer of the Rio Tinto Copper Mining Company estimates that they have in their mines in sight 133,000,000 tons of ore, sufficient at the highest rate of output for any past year to supply sulphur and copper to meet the company's requirements for the next seventy years. This is independent of the remaining unexplored portion of the company's property. The company is in position to turn out steadily 30,000 tons of refined copper per annum.

A DEAL for the transfer of the Silver City and Northern Railroad with the coal lands owned by the company in the San Augustin plains in New Mexico to people representing the A., T. & S. F. R. R. Co. is underway. This, if carried out, says the Silver City *Enterprise*, will mean the extension of the road connecting the iron and copper mines of Santa Rita with the coal fields and will furnish cheap fuel for the reduction of large bodies of ore known to exist in these districts.

ACCORDING to the annual report of the State Mine Inspector of Dakota, for the year ending December 1, 1896, the total output of ore was valued at $6,178,675, and the number of miners employed was 1927, not including men engaged at the mills, smelters and other reduction works, and such other vocations above ground and directly connected with mining operations. This makes an average of $3100 worth of ore taken out per man. Yet many of them were engaged in prospecting and development work.

DREDGING for gold is being carried on in a systematic manner and with success in New Zealand. There are about 40 dredges at work in the South Island, and their average cost is at least $10,000 each, so that there is $400,000 invested in machinery alone for this class of mining. The number of men employed per dredge is about seven, making a total of 280, while the amount of gold obtained last year from the total number of dredges, it is said, reached at the lowest estimate 25,000 ozs., of a total value of $500,000.

MUCH may be said for the good work done by some of the newspapers published in the mining districts toward keeping the business on a legitimate basis. For example, the Angels, Calaveras, *Voice* has this to say of a case of over-capitalization: "The syndicate which bonded the Alabama mine has listed it in London for $600,000. This is an enormous value to place on a prospective mine. It is just such inflations which deter foreign capital from making investments with a view toward actual work, and which, consequently, leave so much good property unworked in this State."

THE idea among many people in the Old World that gold could be picked up in the streets of San Francisco was not so far wrong after all. A man in this city claims to have discovered in one of the public streets a 16-inch ledge from which the croppings assayed $15 a ton. Some years ago a contractor discovered cinnabar on a lot at the corner of McAllister and Devisadero. In 1888 the Mining Bureau assayed ore from the hillside on Liberty street that went $7 a ton. Then, manganese ore has been discovered in Guerrero street. But in all these cases property rights would prevent mining.

THE Montana Mining Company, better known as the Drum Lummon at Marysville, Montana, is about to erect a cyanide plant to work the large quantity of tailings on hand. This mine was a short time practically closed down as the ore bodies had pinched out. The company has paid in dividends $2,890,637. Although the best of machinery has been used, it is claimed that not over 85 per cent of the assay value of their ores have been saved in the mills. They have always made it a point to save its tailings by building dams and it is claimed that there is in these tailings $1,600,000 in gold. This will be the second cyanide plant in Montana and the first to work over old tailings.

THE report for October of Dwight B. Huntley, superintendent of the De Lamar Mining Company, of Idaho, gives the following figures: Number of tons crushed (wet), 4,238.18; number of tons crushed (dry), 3,822.87. Assay value of the pulp: Gold, $15.53; silver, $5.01; total, $20.54. Assay value of the tailings: Gold, $4 69; silver, $1.24; total, $5.93. Percentage saved, total, 71.13; number of of Dore bars produced, 15; number of ozs. pure gold produced, 1,872.9125; number of ozs. fine silver produced, 29,395.27. Value of gold produced (at $20) $37,458.25; value of silver produced (at 65c) $19,106.95; Pelatin-Clerici process—100 net tons worked in official test, one bar produced and valued at $1,498.41; ore sales, $4,000.00; miscellaneous revenue, $315.85; total, $62,379.46; deduct all expenses for the month, $44,890.99. Estimated profit for the month, $17,488.47.

THERE have been incorporated at Spokane, Wash., during this year 363 mining companies, with an aggregate capital stock of $300,925,000. In 1893 there were incorporated 18 companies, with a capital of $18,100,000; in 1894, 11, with a capital of $13,508,000, and in 1895, 19, with a capital of $15,702,500. Time was when a capital of $500,000 was most common. Now the favorite amount is $1,000,000; but many have been incorporated for larger amounts, one for as much as $20,000,000. Customs grow up out of necessity, generally, but what is the need for large capitalization for small mines is not apparent. It is becoming a custom to incorporate all properties, large or small, for more than they are claimed to be worth.

THE State Commissioner of metalliferous mines of Colorado reports that there are 25,545 men engaged in mining in Colorado, divided into the following classes: Underground, 15,924; topmen, engineers, ore sorters, trammers, carpenters, 3466; millmen, smelters and sampling works, 5061; teamsters and packers, 1094. By counties they are distributed as follows: Arapahoe 1152, Archuleta 45, Boulder 1353, Conejos 27, Chaffee 482, Clear Creek 1312, Custer 189, Costilla 18, Dolores 356, Douglas 135, Eagle 162, El Paso 3575, Fremont 477, Gilpin 2160, Gunnison 704, Hinsdale 432, Huerfano 23, Jefferson 35, Lake 3984, Larimer 86, La Plata 410, Mineral 336, Montezuma 45, Ouray 1167, Pueblo 1660, Park 381, Pitkin 1500, Routt 128, Rio Grande 75, San Miguel 1105, San Juan 1351, Summit 412, Saguache 268, total 25,545. During the last two years there have been 316 accidents; 154 were fatal and 162 were not fatal. Falling rocks were responsible for the majority of the casualties.

FROM different localities come reports of solicitations of "write ups," etc., of mines for this paper. After thirty-seven years of honorable existence it should not be necessary to say that no one, anywhere, at any time is authorized to solicit such business for this paper. Nor is any one anywhere authorized to receive subscriptions for this paper unless he has a written appointment, stamped and dated at this office. The MINING AND SCIENTIFIC PRESS publishes authentic news from its own correspondents or from the columns of reputable local newspapers regarding mines in every part of the country, but has yet to take its first dollar for putting anything in or keeping anything out of its reading columns regarding a mining property. If anyone offers to secure a paid notice of any mine in this paper, he can be safely put down as attempting to obtain money under false pretenses. None of our agents or correspondents attempt such work. And if any agent or correspondent of any paper is found using the name of this paper in the securing of such questionable business he is liable to prosecution.

SOME time ago W. E. Miles, a stockholder in the Bodie Con. M. Co., brought an action against R. B. Woodward, a director in the company, to recover $1000, liquidated damages, for a violation of the provisions of the act of April 23, 1880. The violation complained of was the alleged failure, refusal and neglect of the directors to make public the weekly reports of the superintendent, as required by the act. The lower court decided against Miles. He appealed. The Supreme Court has reversed the judgment and order, and remanded the cause for a new trial. In the opinion the constitutionality of the act is discussed. The question concerning constitutionality was raised on the point that the act operates only upon domestic corporations, and thereby allows foreign corporations to transact business within this State upon more favorable conditions than are presented by law to similar corporations organized under the laws of this State, in violation of Article XIII, Section 15, of the Constitution. The Supreme Court holds that the law is solely designed to protect stockholders of domestic corporations; and, further, that the act does not apply only to those mining corporations which extract gold or silver from ores and quartz.

THE prospectus has been issued in London of the Mountain Copper Co., Limited, formed to purchase from the Mountain Mines, Limited, of Shasta county, its properties, located near Redding. The capital is £1,200,000, or nearly $6,000,000. The purchase price is £416,630 in fully paid shares and £733,370 in cash, or fully paid shares at the option of the company, leaving a balance of £100,000 for working capital. The prospectus describes the property as "The well-known and remarkably rich copper mines belonging to the Mountain Mines, Limited, of Iron Mountain, Shasta county, California, the smelting works connected therewith, as well as the entire interest in the railway to the mines, and also the refining works in the neighborhood of New York." The report of J. D. Hague is quoted to the effect that the quantity of ore laid open is 1,338,183 tons. Mr. Fielding of the Mountain Mines says that "the cost of production is £2 19s 9d per ton of ore, or £34 3s 4d per ton of copper, and that this cost can be reduced 15s per ton when the company has its own Bessemer and electrolytic plant. The directors estimate that the net profit will be £320,000 per annum, or over 25 per cent on the company's capital, while the total profit on the richer portion of the mines, thus developed, would exceed double the entire capital of the company."

THE House Committee on Mines and Mining has reported favorably the bill introduced by Representative Allen of Utah at the last session of Congress amending the revised statutes of the United States concerning affidavits required to be made before the register and receiver of land offices in the matter of determining the mineral or non-mineral character of lands. The amendment provides that such affidavits may be verified before any officer authorized to administer oaths and all testimony and proofs may be taken under such officer. In cases of contest as to the mineral or agricultural character of lands testimony and proofs may be taken under such notice and regulations as the Commissioner of the General Land Office may prescribe, provided that the presence of rock in placer or deposits bearing gold, silver, cinnabar or other valuable minerals shall be regarded as prima facie evidence that the land containing the same is mineral in character; providing further, that in investigating the character of the land with a view to ascertaining whether it is more valuable for mineral than agricultural purposes, evidence may be taken of mineral discovered or developed adjacent to such land, proof of which shall be corroborative evidence that the land in question is mineral in character; and provided further that wherever land is proven to be within a well defined mineral belt it shall be deemed prima facie evidence of the mineral character of said land.

The Solution and Precipitation of the Cyanide of Gold.*

NUMBER II.

By S. B. CHRISTY, Professor of Mining and Metallurgy, University of California, Berkeley, Cal.

2. *The Effect of Oxidizing Agents.*—This point being clearly proved, the question next arose: Would not other oxidizing agents, capable of liberating nascent cyanogen in a cyanide solution in the presence of gold, also cause its solution? Several hundred experiments showed that this assumption was likewise correct. Nearly all the oxidizing agents were found to be effective. Among those used were: Potassium chlorate, nitrate, permanganate, bichromate and ferricyanide, and the peroxides of barium, manganese, lead and sodium. Each of these, and other oxidizing agents, when added to a potassium cyanide solution, increased the solubility of the gold over that shown in a similar solution without such addition. Among the most convenient and efficient of these agents were peroxide of sodium, peroxide of manganese and ferricyanide of potassium. These experiments were made in 1892–3. It now became apparent that there were many analogies between the cyanide process and the chlorination process. In the chlorination process the gold requires only free chlorine and water for its solution, as the chloride of gold is soluble in water, but in the cyanide process there are required, first, free cyanogen to form the cyanide of gold, and then free cyanide of potassium to form the soluble double cyanide.

As these facts became clear, other means of producing nascent cyanogen in the presence of metallic gold and a solution of potassium cyanide suggested themselves. Cyanogen bromide was the first of these agents that proved effective, in experiments made January 19, 1894. When cyanogen bromide is added to a solution of potassium cyanide the following reaction ensues:

$$BrCy+KCy=KBr+2Cy.$$

In the presence of metallic gold and an excess of potassium cyanide, the further reaction ensues:

$$2KCy+2Au+2Cy=2KAuCy_2.$$

Or, as the two reactions are in reality simultaneous, this may be expressed, as has already been done by Mr. Sulman,† as follows:

$$3KCy+2Au+BrCy=2KAuCy_2+KBr.$$

The success of the above experiment was so great that ten days later, January 29, 1894, a similar process was tried. This was, to add a small amount of dilute bromine water to a dilute stock solution of potassium cyanide, the latter in chemical excess, in the presence of metallic gold.

The reactions that takes place may be analyzed as follows:

$$(a)\ 2KCy+Br=KBr+Cy+KCy.$$
$$(b)\ Au+Cy+KCy=KAuCy_2.$$

Or, as the reactions under favorable circumstances may be simultaneous:

$$(c)\ 2KCy+Au+Br=KAuCy_2+KBr.‡$$

Of the two reagents, bromo-cyanogen and dilute bromine water, I distinctly prefer to add the latter to the potassium cyanide solution, in spite of the opinion of Mr. Teed§ to the contrary. The use of the dilute bromine water is much the simpler method, as the reagent is easily made of any desired strength and may be added as needed, care being taken always to have the potassium cyanide in excess, and not to add the bromine water faster than the cyanogen set free can be absorbed by the gold. To do this correctly requires experience and skill; and unless the work is in the hands of a competent metallurgist, a great loss of cyanide and poor results will follow, whether bromo-cyanogen or bromine water alone is added to the stock solution of potassium cyanide. The reason of this appears to be the great tendency of free cyanogen to form paracyanogen, to oxidize into certain obscure compounds of a dark color, and to "run down" generally. Hence, if the cyanogen is set free faster than the gold can absorb it (owing to lack of contact at the time that the cyanogen is set free), a loss of cyanogen takes place to no useful purpose. Strong solutions of bromine and cyanide of potassium should be avoided for like reasons.

The ideal requirement seems to be to secure that intimate molecular contact which is assumed in equation (*c*), above. In this case the cyanogen reacts in the nascent state. This is a condition hard to realize in the treatment of ores.

In the treatment of gold strips in cyanide solutions, I found that with a given cyanide solution and a given bromine water solution, the amount of gold dissolved by the combined treatment with cyanide and bromine water was, in one case, four times as great as the sum of the amounts of gold dissolved by the same amounts of cyanide and bromine water solutions, each acting separately, all the other conditions being the same.

Chlorine water may be used instead of bromine water. According to the reaction in equation (*c*), 1 ounce of bromine as such will cause the solution of 24.5 ounces of gold, while 1 ounce of chlorine will cause the solution of 5.52 ounces of gold, and, as per Ellsner's reaction, 1 ounce of oxygen will dissolve 2.45 ounces of gold. Weight for weight, the oxygen is more effective than either chlorine or bromine. I have also found that, properly applied, the oxygen of the air gives as good and even better results than either chlorine or bromine. But the latter, being more soluble in water, are more conveniently used.‖

It may be concluded from these experiments that cyanide of potassium solutions, acting alone, are absolutely without action on metallic gold; that the addition of some substance capable of taking the potassium away from a part of the cyanogen, thus setting the latter free in the nascent state, is an essential condition to the solution of metallic gold in potassium cyanide; and that this agent may be either the oxygen dissolved from the air, or supplied artificially, or a suitable oxidizing agent, such as some of those already mentioned, or an equivalent addition of chlorine, bromine, or iodine, or the compounds of these with cyanogen.

Which of these should be used will depend on many conditions, hard to specify briefly. There is danger in using too strong an oxidizer or too much of it. In such a case, not only are other secondary reactions likely to ensue with ores containing metallic sulphides, arsenides and antimonides, which lead to the destruction of the cyanide, but, as already pointed out, the free cyanogen itself, if set free faster than it can be taken up by the gold, simply runs down into oxidized products without doing any good. This is the great difficulty in the treatment of low-grade ores. Nothing but experience and intelligent and trained supervision can meet this difficulty.

One cannot avoid noting a certain analogy between the action of oxygen of the air on the blood and on the cyanide solution. In the former the oxygen is held by the red corpuscles in a state of readiness for combination, but it is not actually used for combustion except under the nervous stimulus which determines combustion at the point where energy is to be produced. In the cyanide solution, the oxygen and the cyanide of potassium may exist side by side in solution (as experiment shows) without sensible action on each other, unless the presence of gold determines the Ellsner reaction at the point where oxygen, water, gold and cyanide of potassium meet. If a thorough utilization of the cyanide is desired, the action of the oxidizer should be such that the cyanide will be decomposed only under the stimulus of the presence of the gold. Under these circumstances, the cyanogen will be utilized to the utmost. If, however, the oxidizer is a powerful one, capable of attacking the cyanide on its own account in the absence of gold, the inevitable consequence will be a rapid destruction of the cyanide, just as would be the destructive effect of such oxidizers on the blood.

It cannot be too much emphasized that it seems to be nascent cyanogen only that acts on the blood. I have tried saturating a cyanide of potassium solution with free cyanogen, but have usually obtained only very unsatisfactory results. The tendency to form paracyanogen probably explains why the cyanogen in this case has no little effect on the gold. The further tendency of the paracyanogen to absorb oxygen and run down explains also why its presence in quantity is not only of no use but is a positive detriment, as it prevents the oxygen from setting free nascent cyanogen which can attack the gold.

On the whole, with low-grade ores and dilute solutions, the cyanide solution itself will, if properly aerated, carry oxygen enough to dissolve the gold; so that artificial oxidizers are seldom needed, unless there is some reducing agent present in the water or the ore, which absorbs the oxygen. In such a case, and with richer ores and stronger solutions, there is sometimes a distinct advantage in the use of oxidizing agents. But, unless used with the nicest discrimination, they do more harm than good.

3. *The Solubility of Gold Sulphide in Potassium Cyanide.*

There still remains a great difference of opinion as to the condition in which gold occurs in its ores. There is no doubt that the greater part of it occurs in the metallic state. Many contend that it is always metallic. It cannot be denied, however, that it occurs combined with tellurium, and there is some evidence that it occurs combined with other sulphides, antimonides, arsenides, and, perhaps, with bismuth, to form compounds little understood, but of great practical importance in the treatment of sulphide ores containing gold.

It seems to be impossible to combine gold with sulphur alone in the dry way. I have, therefore, tried the sulphide of gold, Au_2S_2, thrown down from the acid chloride by sulphydric acid gas. In a 5 per cent solution of potassium cyanide this sulphide dissolved completely in four minutes; in a 1 per cent solution, in ten minutes; in a 1-5 per cent solution, in one hour. In all cases there were found in solution sulphide of potassium (K_2S) and sulphocyanate of potassium (KCyS), and, in most cases, suspended sulphur. The latter was most apparent with the dilute solutions of cyanide.

The reactions which occur seem to be expressed most simply by the following formulas:

$$Au_2S_2+4KCy=2AuKCy_2+K_2S+S. \quad ¶$$
$$KCy+S=KCyS.$$

A third reaction seems indicated by some of the quantitative results, viz.:

$$Au_2S_2+K_2S=Au_2K_2S_2+S.$$

The exact relation of these three reactions seems to depend on the strength of the cyanide solution used. The remarkable solubility of the sulphide of gold is no doubt partly due to the greatly increased surface of the sulphide exposed to the attack of the solvent; but it is also due, no doubt, to the double affinities set up between the gold and the cyanogen on the one hand, and the potassium and the sulphur on the other. There is evidently no call here for oxygen or an oxidizing agent to increase the solubility of the gold.

4. *The Solubility of Gold Telluride in Potassium Cyanide.*

It being very difficult to prepare the telluride of gold in a wet way, similar to that in which the sulphide of gold was produced, I have experimented with telluride of gold prepared by fusing pure gold with tellurim, as well as with natural minerals containing tellurium and gold and silver.**

The result of the experiments so far made has been to show that the tellurides of gold and silver experimented on both dissolve in the cyanide solution with the greatest difficulty. This is probably due to the fact that the affinity of potassium for tellurium is much smaller than for sulphur; but tellurium, tending to absorb oxygen thus forming tellurous acid, also tends to retard the oxidation of the potassium and the solution of the gold.

5. *The Solubility of Antimonide of Gold in Potassium Cyanide.*

An antimonide of gold produced by fusion of the pure metals acted very much as did the telluride of gold. A copious white powder of antimony oxide formed in the solution and the action was retarded, probably for the same reasons as operated with the telluride of gold.

(To be Continued.)

THERE has been more activity in the development of and search for copper mines on the part of capitalists seeking investments in mining ventures than in any other class of properties except, perhaps gold. The largely increasing demand for copper for use in electrical appliances and transmission plants gives promise that the price of copper will continue to advance for a number of years unless very much larger increase is made in the output than at present seems likely. In spite of the larger amount placed on the market during the past year prices have increased. Yet in spite of this there has been very little interest taken by miners in California in the deposits that are known to exist.

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*Colorado meeting American Institute of Mining Engineers, Sept., 1896. (Revised Proofs Dec. '96.)

†Messrs. Sulman and Teed claim (in the *Eng and Mining Journal*, February 23, March 30 and April 30, 1895), to have made the first discovery of this reagent, and they received an English patent Sept. 14, 1895. Whether their work antedates mine or not, I do not know. A. W. Warwick, in a valuable paper in the *Eng. and Min. Journal*, June 29, 1895, claims to have made the same discovery independently, but does not give the date, and seems to misunderstand the real nature of the reaction that takes place, assuming that oxygen must be present when cyanogen bromide acts in a solution of potassium cyanide in the presence of gold. The MINING AND SCIENTIFIC PRESS of March 2, 1895, says that some months previous to that date a letter had been received from an assayer in northeastern Washington, claiming that bromide could be substituted in the cyanide process. E. A. Schneider, *Eng. and Min. Journal*, March 23, 1895, makes a similar claim. It would, therefore, appear doubtful whether Messrs. Sulman and Teed are the original discoverers of the bromo-cyanogen process.

‡In the *Eng. and Min. Journal*, June 1, 1895, in an article on "A Bromo-Cyanide Process for Gold Extraction," Mr. C. A. Mulholland offers the following provisional explanation of the reaction which takes place when bromine is added to cyanide solutions in the presence of gold:

$$4Au+8KCy+2Br+O_7+H_2O=4AuKCy_2+2KBrO_3+2KOH.$$

This very involved reaction appears to have been imagined because it was supposed that gold could not dissolve unless oxygen was present, the author having lost sight of the fact that the bromine is capable of doing the same work as oxygen.

§*Eng. and Min. Journal*, April 20, 1895.

‖A possible application to the chlorination process suggests itself. Owing to insufficient roasting or imperfect gassing, the tails from the chlorination vats often run high. At present these must either be thrown away or else dried, reroasted and regassed and leached. It might be feasible to have a set of large tailing vats into which such lots may be thrown wet and leached with a dilute solution of cyanide until they were sufficiently low in gold to throw away. The small amount of chlorine remaining in such tails would act to set free cyanogen enough to fix the gold. Care should, of course, be taken to wash out soluble metallic salts and to neutralize the free acid before adding the cyanide. Such a method is likely to fail in the hands of Mr. Stetefeldt's old enemy, "the muscular amalgamator." And it is doubtful whether sintered clots, formed in roasting, and coarse gold which has escaped the amalgamator, would yield to this treatment.

¶It seems hardly necessary to add that in dilute solutions the K_2S is dissociated by the water present, according to the following reaction:

$$K_2S+H_2O=KHS+KHO.$$

**I have had great difficulty in obtaining material of this kind of sufficient quantity and purity for the work, and would be greatly obliged to members of the Institute who will supply me with adequate material. What I particularly desire is the pure tellurides of gold and silver existing separately in such quantity that it will pay for the outlay of time and labor necessary for analyses and experiments.

This is a reprint of the original issue of this date. The big fire in this city on Christmas Day destroyed nearly our entire edition, which was just ready for the mail. The matter was reset, and, with the exception of a little unavoidable delay, the 26th issue of Vol. LXIII of this paper reaches its readers as usual.

Some Points on Prospecting.

A Shotgun Talk With Prospectors. — The average prospector is altogether too superficial in his work; finding a vein of certain mineral-bearing formation, he is content to pick—prospect it in one or two of the larger outcrops. If at these points the blossom rock is barren, or spoon, pan or other simple test gives no satisfactory return, however promising and "lively" the country formation, inclosing rocks, or vein stuff may be, it is considered "no good," and the field is abandoned.

It would appear that our itinerant friend does not realize that the occurrence of pay ore—when in bonanza in a lode claim—is about as one cubic foot in five hundred.

Now, pay is found as pockets or chambers, shoots or chimneys, in strata, mass or patches. Hence, would it not appear to be simply a case of Chinaman luck for a man to strike pay in the ordinary haphazard, quien sabe method, as above outlined? And that is the rule. The apex of a shoot or chamber, when outcropping, may often be covered by less than a saddle blanket; wedge-shaped, with the point upward, and "blind" on either side. A week, at the longest, of desultory pick work, with no good returns, in an extensive virgin territory convinces the easy-going burro puncher that the El Dorado is just "over the divide," and "manana" he will "strike it." There will be more finds recorded when the prospector, having discovered a fruitful territory—if it is in human possibility—camps right there for the season, and, if necessary, when the lode is blind, trench to find the source of "float," and cross-cut every 10 or 20 feet along the line of the lode claim. Stay with it; persistency will win.

If you expect the cow will back up to be milked, you will surely drink black coffee to the end of the chapter.

Points for Prospectors.—Desert prospecting has peculiar conditions, favorable and otherwise. There is no dense vegetation, brushwood or other concealing mantle veiling the face of nature. The rocks crop keenly to the eye in the mountain ranges—a very open book—so that he who has geological knowledge may read as he rides. The disintegrating, weathering, of the more friable, softer rocks alone rendering "blind" certain lode veins. These are often the richest, and may be passed by for years. Witness, in Yuma county, Arizona, the Harqua Hala gold mine, for fifteen years a stamp mill had been pounding on low grade gold quartz six miles away; rich float, found by accident, resulted in the discovery of this noted mine, which is paying well to-day, and the La Fortuna, near Yuma, drywashed by Mexican gambusinos, run over and on line of travel for thirty years, diligent search and trenching by skilled American prospectors for the source of rich gold float, uncovered less than two years ago the mine that is now shipping from twenty head of stamps $80,000 per month. These are but practical illustrations of what may be found all along the Pacific coast.

The lack of water is the principal disadvantage we labor under through the desert. This winter season of '96 there has been copious rainfalls, insuring a good supply of water in the mountain tanks, or natural reservoirs. To first locate these tanks and then mineral prospect is the proper method. When well-beaten sheep or deer trails converge toward a common center in a canyon-rent mountain range, preferedly showing evidence of dike formation, is where tanks are likely to be found. No man should perish from thirst in this desert region, if he can find the following varieties of cacti: If in the mountains, the Nigger Head cactus will generally be found, with its egg-shaped, curly, crimson-spiked jacket, inclosing a water peth, not unlike an insipid turnip, that will allay both thirst and hunger. On the mesas you may chance upon the lofty column of the Monumental cactus; having no way of cutting through the tough skin that covers its water-logged true inwardness, take a rough stone, hack and abrade the gnarled roots, that often extend above the ground, and you may suck the moisture from this bruised member.

Some Useful Wrinkles.—The hard times have sent many novices into the field. To them particularly is this letter addressed. The old timer, however, has much to unlearn—and several things to learn. We will not consider that variety of grubstake prospector (?) whom one of your correspondents has so aptly styled the "desert hobo." He is very much in evidence now, and runs more to fat than industry.

The prevalent fault of the old timer is apt to be that he is too positive, too bigoted, and is generally married to certain (to him) favorite formations, and will have no good in others.

To illustrate: The Montana miner insists on "gramite" as a necessity in the country formation; the Californian, in "contact," or in close proximity "slate" is a prime factor in a gold belt, etc. They do not appear to consider that nearly all kinds of rock are combinations of two or more minerals, and there are many kinds of their favorite formation, a few "fruitful," many "hungry." Nor do they realize generally, how the deposition of mineral is effected by proximity of other rocks. Everyday experience and discoveries verify the trite but true saying that "silver is in veins, and gold is where you find it."

Having by the following simple tests for the more precious metals found your rock contains the minerals sought for, send samples of ore for assay to ascertain the quantity and value per ton. This is of vital importance and too little assaying is done.

Gold.—Powder; roast if sulphurets are present; grind very fine and wash in pan or spoon; examine with lens; yellow particles not soluble in nitric acid. The color of pure gold is bright yellow, tinged with red. Gold may be distinguished from all other metals or alloys by the following simple traits: It is yellow, malleable, not acted on by nitric acid.

Silver.—Pure silver is the brightest of metals, of a beautiful white color, and rich luster.

Chloride of Silver.—If suspected in a pulp, harshly rub a bright and wet copper cartridge thereon. If a chloride or chloride-bromide of silver, it will whiten the copper. Graphite will thus whiten copper or gold, but can be rubbed off.

Copper.—After roasting pulp, intimately mix and well knead with a like quantity of salt and candle grease, or any other fat, and cast into the fire, when the characteristic colors—first blue, then green—will appear. This copper test is better made at night.

Galena.—Black zinc-blende is often mistaken for galena. The two may be distinguished by this infallible sign: the powder of galena is black; that of blende, brown or yellow. TAYLOR D. MACLEOD.

Yuma, Arizona, Dec. 20, '96.

A "Mother Lode" in the Cascade Mountains.

Several times I have seen mentioned and described in the columns of the MINING AND SCIENTIFIC PRESS the so-called mother lode of the Sierras. Nevertheless, so far, I have not been able to form for myself a concise idea about the geological and mineralogical occurrence of that lode. Is it a single vein, a dyke, or a body of heavy mineralized country rock, or an irregular accumulation of veins or pockets in the contact of two formations, broken up, dislocated, disturbed and metamorphosed by plutonic or volcanic rocks? According to the descriptions given, I am not able to answer any of these questions. If this "mother lode" is expected to be found in the northern continuation of the Sierra, which are the Cascade mountains in the States of Oregon and Washington, probably I might be able to throw some light on this question.

About fifty miles east from here, in the highest range of the Cascades, north of Mount St. Helens, we discovered several years ago an extensive mining region, which had shown in its geological characteristic a striking similarity to the well-known mining regions of the Sierra and the Rocky mountains in Colorado. Stratified quartz, black and blue slate, talcose slate, quartzite rocks are broken up, metamorphosed and intersected by eruptive rocks of almost every kind. This region is about three miles wide, its extension from north to south is yet unknown. It is literally full of fissures, crossveins and heavy mineralized dykes of every width and directions. Some of these dykes show a diameter of more than one hundred feet. Seams and pockets of ore are seen to occur almost everywhere. They all contain different kinds of copper ores and pyrites of every description, having in some localities considerable gold and silver.

Almost all these ores—only a few exceptions are known, so far—are very refractory; placer gold has been found only sparingly and exceptionally. The whole region is easily accessible, but heavily timbered (fir, red and yellow or Alaskan cedar, spruce, pine, mountain larch and hemlock predominating).

As part of the ranges reach far above the timber-line (between 7,000 and 8,000 feet above sea), and as there is heavy snow every winter, there is an abundance of everlasting water power in the whole territory.

If this region belongs to the formation where the so-called "mother lode" is expected to occur, it may be considered as the missing link in the chain of conclusions. K. LUDLOFF.

Toledo, Wash., Dec. 14th, '96.

A Proposed Two-Mile Shaft.

A correspondent of the London *Mining Journal* suggests that the British Government should take up the question of aiding the Cornish mines and proposes that a shaft be sunk in the Caradon Hills two miles deep. He says:

"The deepest shaft in the world is, I think, the Maria shaft, Prizibram, Bohemia, said to be 608 fathoms 2 feet. The maximum speed ever attained in winding is said to be 3000 feet per minute. With guided cages it is, I think, estimated that to draw two tons of stuff at this speed will require engines of 400 H. P. Now, sinking a shaft a mile would represent 880 fathoms, and 282 fathoms deeper than the great shaft in Bohemia. If you take £200 a fathom to sink 880 fathoms, it will be £176,000, and if 50 per cent is added to that for the second 880 fathoms, we get for that £264,000, or for a shaft two miles deep £440,000. Now, allowing for all eventualities, one million sterling would put down a shaft in the Caradon Hills two miles deep. This is a small contribution for a paternal Government."

A shaft in the Calumet & Hecla mines in Michigan is down 4,900 feet.

Some of Nevada County's Mines.

Grass Valley, Cal., has the reputation of having small ledges and much tribute work, and I learn from several superintendents that they prefer a 14-inch vein in this section to the large ore bodies of low grade in other parts.

The tribute workers, as a rule, are prosperous. It costs from $8 to $10 to keep the mine open and to mine and mill the ore, which averages in most cases from $30 to $40. There are large ledges, nevertheless. There is also much undeveloped country here awaiting outside capital.

Deep mining is in every case the successful method pursued. It is well known that Grass Valley miners think nothing of going a half mile down into the earth, of which a notable example is the old Idaho, which to-day has engine, pumping works, a stable and two mules 1000 feet underground, and the total depth attained is 3100 feet.

The principal plants in operation, together with number of stamps and locality of ownership, are as follows: The Maryland, operating through the old Idaho, 40 stamps, owned by local and San Francisco people; the Empire, 40 stamps, New York and San Francisco people; North Star, 40 stamps, New York people; W. Y. O. D., 20 stamps, San Francisco and local people; Omaha Consolidated, 28 stamps, San Francisco people; Brunswick, 20 stamps, New York and local perple; Pennsylvania, 5 stamps, local people; Gold Hill, 10 stamps, San Francisco people; Southern, 10 stamps, custom mill; Orleans, 5 stamps, local and San Francisco people; Electric, 10 stamps, Sacramento people; Perrin—or Slate—mine, 10 stamps, local people; Granite Hill, 5 stamps, Sacramento people.

Among the once abandoned properties now being reopened, together with some new developments, with locality of owners and depth attained to date, are the following: The Kate Hayes, San Francisco people, 200 feet; Kentuck, San Francisco people, 400 feet; Wisconsin & Illinois, local people, 600 feet; Norambagua, local people, 400 feet; Massachusetts, property of North Star, 400 feet; Bullion, San Francisco people, 600 feet; Crown Point, French people, 500 feet; Independence, San Francisco people, 800 feet; Franklin, San Francisco people; Central Q. M., San Francisco people; Gold Point Consolidated, 200 feet.

Water costs 18 cents per inch for twenty-four hours. Wood averages $4 per cord.

The Gold Hill is using electricity for milling and hoisting.

The Massachusetts is using electricity and compressed air for the hoist.

Two additional mines are preparing to use electric power.

Some years ago the Allison Ranch mine, having reached a depth of 700 feet and made its owners wealthy, was abandoned. Recently Messrs. Mackey and Flood secured the property. The Allison ranch and the Allison ranch station comprise about sixty-five acres, under one ownership. After the preliminary work of securing water and ditch rights, and pipe line, the work of erecting the present plant was bugun in June. They have substantial buildings for power house, hoist and residence.

The superintendent of construction expects to start pumping the old shaft about the middle of next month.

The plant is arranged for water power to drive the compressors, pumps and hoist. This is so arranged that, if interfered with or shut off, steam can be used; or, in the event of failure of either of these, electric power can be turned on. The latter—240 H. H.—is derived from the Nevada County Electric Power Company. The plant can be run by these three powers jointly, in which case it is capable of producing over 640 H. P. Any one of the motive powers can be used alone, or two, or all three jointly. This method of utilizing the three different powers is supposed to be the first case of the kind in existence.

The compressed air system comprises the double stage compressors of 250 H. P. capacity. The underground pumps and machinery are built on the compound system, and all the air before entering the pumps or engines is reheated, so as to obtain the greatest useful effect from the combined system. The construction of this work, a model of its kind, is done under the supervision of Mr. W. R. Ackert, who for eighteen years has been the consulting engineer of Mackey & Flood and of the Union Iron Works. J. F. L.

Grass Valley, Cal., Dec. 16th, '96.

Nevada City District Geology.

NUMBER III.

Economic Geology.

Gold.—Although gold is widely distributed over the Sierra Nevada, in veins and placer mines, there are but few regions in it which show such a concentration of valuable deposits within a narrowly circumscribed area as occurs in the districts described in this folio. The mines in the Grass Valley district have been and are especially productive. Next in production follows the Nevada City district, and the Banner Hill district comes third. Statistics for the first decades succeeding the discovery of the gold in 1849 are very defective, but it is estimated that the mines in the three districts together have produced $120,000,000 up to the present time. Most of the production of early days came from the placer mines, which were often of extraordinary richness. Of late years the gold from Grass Valley is derived almost exclusively from the quartz mines, while in the other districts the placer mines still contribute a small part of the product. Since 1889 the product of Nevada county has been constantly about $2,000,000 per year. Of this, from $1,100,000 to $1,500,000 comes from the areas of these special sheets (including the Brunswick area and the maller mines on Deadman's Flat, four miles southwest of Grass Valley). Grass Valley and vicinity leads, with a production of $750,000 to $1,000.000, while Nevada City (Nevada City and Banner Hill maps) follows, with from $300,000 to $600,000. The larger amount of the production from Grass Valley has come from a few prominent mines, such as the Eureka, Idaho, Empire, North Star, Omaha and W. Y. O. D. In the vicinity of Nevada City the mines west of the town, usually referred to as the "Creek mine," have yielded the largest quota.

Auriferous Gravels.—The disintegration of the gold-bearing quartz veins has, as is well known, yielded the material for the gravels. The gold set free is in part distributed through the mass, but as a rue the larger quantity has been deposited on the surface of the older rocks on which the gravel rest, or, as the miners say, on the bedrock. The Neocene auriferous gravels, some of which are exposed, others being buried under several hundred feet of unproductive clay, sand and volcanic material, lie in the channels of the Neocene streams from 200 to 500 feet above the bed of Deer Creek. Wherever exposed without heavy covering material they have been washed by the hydraulic process, by which the whole mass of the gravel is removed. The richest gravels in the bottom of the old stream are removed by drifting along the bedrock and subsequently washing the mined gravel. By the former process, gravel containing only 5 or 10 cents per cubic yard may be made to pay, while the latter process requires a value of at least $2 or $3 per cubic yard. Hydraulic mines have not been operated in the district for at least ten years on account of the debris litigation. The only ground adapted for extensive mining with the hydraulic process is found near Nevada City. The alluvial gravels are the auriferous accumulations in the depressions of the present surface. Every creek and ravine in these districts has been worked over one or several times by sluicing, and very little gold is now obtained from this source.

Within the area of the Nevada City and Banner Hill maps a small hydraulic cut has been made in the fine gravel to the east of the Cold Spring tunnel. A large opening has been made to mine the channel south of Deer Creek, a short distance southwest of the Lecompton mine. As the gravel is very thin and a bank of 100 feet of andesitic tuff is already exposed, not much more can be accomplished by hydraulic methods. Drifts have been run for a short distance, but no work is being done now. The same statement applies to the hydraulic cut south of the Murchie mine, where a minor channel runs north and south. For some distance from this point along the rim, hydraulic work could be prosecuted. To the east the bedrock rises rapidly. Thence southward to the reservoir smaller hydraulic cuts have been made at intervals along the lava contact, either on smaller channels, or, more frequently, on the decomposed croppings of quartz veins extending under the lava. Especially extensive are the old pits in the vicinity of the Mayflower mine, where some ground is yet left for hydraulic operations. Some tunnels have been run in under the lava at various places.

The drifting operations under the Harmony Ridge are extensive. The Harmony channel, with its branches, has been opened and worked profitably by the Cold Spring incline and tunnel, and lately by the East and West Harmony inclines. A northern branch has been mined from Stokes shaft and other places in the vicinity of Monroe's vineyard. South of this, attempts to reach the same channel have been made at the Yosemite incline and at the edge of the Banner Hill district. Allison's tunnel and incline are now being driven in search of the continuation of the Harmony channel. In the adjoining district it has been mined almost continuously from Coleman shaft and Nevin's and Laney's tunnels to its outlet. The pay gravel in the Harmony channel is from 150 to 200 feet wide and only from 2 to 4 feet deep. It is frequently subangular, and contains many quartz boulders. Gold-bearing quartz veins are sometimes exposed in the bed. As it is firmly cemented, it is necessary to crush the gravel in stamp mills in order to extract all of the gold.

The Manzanita channel has been worked extensively by hydraulic methods from its southern end, and also to some extent at the northern end, at Howe cut. Between these points it has also been drifted nearly continuously by the Manzanita, Nebraska, Live Oak, Odin, and other companies. Near the Nebraska incline the channel was narrow and especially rich, while to the north the gravel spreads out considerably and is more spotted in character. The channel is estimated to have produced over $3,000,000. The most extensive hydraulic mines are southwest of the Sugarloaf, where an area of at least 100 acres of bedrock has been exposed. The different portions of this ground, going westward, are referred to as Buckeye hill, Oregon hill, Coyote hill, Lost hill, Wet hill and American hill. Over this ground the gravel probably averaged over 60 feet in thickness. The last work done before the debris litigation was in the extreme northwestern corner, and is referred to as the Hirschmann cut, from which, it is said, $100,000 have been taken. The whole mass hydraulicked contained, roughly speaking, 10,000,000 cubic yards, and has probably yielded several million dollars. The hydraulic operations could be continued for some distance northward, until the overlaying clays and tuffs become too heavy for profitable handling.

(To be Continued.)

The Rand Mining District.

From Our Special Correspondent.

The Rand mining district is located in Kern county, California, and is 26 miles north of Kramer, on the A. & P. R. R., and 40 miles northeast of Mojave, on the S. P. R. R. Daily stages run from Kramer and Mojave to the camp.

Mining men from all parts of the country are looking over the camp. Speculators are buying; conservative mining men are looking on.

There has been but little development work done, most of that having been on the surface in taking out rich bunches. The camp deserves thorough development work, and needs practical mining men; but until many of the present owners let go, there will be but little permanent work done. Many of the present owners are not able to develop their properties, and many others lack knowledge and are not willing to give practical miners a chance.

The country for miles around Randsburg has been located, some parties holding as high as twenty and thirty claims each, and some even more. Many of these claims have not been recorded, and no work done on them; still the prospector insists that he can hold the claims. Much confusion prevails at present, and much trouble is expected January 1st. Prospects are held at high prices, and as the terms are 30 days or spot cash, few claims are changing hands.

The ore of the camp is, with few exceptions, free milling, which, with custom mills near the mines, makes it possible for the prospector to work his ore. Many of the prospectors are shipping ore extracted from or near the surface.

In some cases the ore extends down but a few feet, others are down 130 feet in good ore. The general strike of the ledges is east and west. Dip north 40° to 80°. The ledges range in width from a few inches to 30 feet. The free milling ore of the camp is shipped to Kane Springs and Garlock, a distance of 19 miles, the former place having one stamp mill, the latter place two mills, with two more in course of erection. The cost of shipping and milling ore is $10 per ton from any part of the camp, which makes it profitable to ship all or nearly all of the ore in the camp, as no ore is worked that pays less than $25 per ton.

The mills are not able to handle the ore offered. More mills are needed to handle the ore of the camp. The mines are all dry and require very little timbering, old railroad ties being the timbers used at present. Water is very scarce; in fact there is no wood nor water near the mines, and unless water is developed in the vicinity the cost of reduction will remain high.

This camp is a poor place for miners and laborers who are looking for employment. There is no work at present, the camp is full of idle men, and until things settle down to a solid basis and permanent development work is commenced there will be no need for miners. There is plenty of room for practical prospectors who have a few hundred dollars. There is an unlimited amount of mineral ground which is worth thorough prospecting, but a man without money can do nothing and should keep away from Randsburg.

The population of Randsburg at this date is about 1500 and more are coming on every stage. At this date the mines working employ about 100 men at $3 per day. More men will be employed as soon as permanent development work is begun, which will not be until most of the property changes hands. The present owners are working the mines for all there is in them, taking out the best ore and leaving the low grade. The future of Randsburg looks very promising, and if the ledges go down it is sure to be a booming camp for years. The mines have all paid from the grass roots. Every dollar that has been put into the mines has been taken out of them. Rand, Butte, Wedge and Good Hope have all produced thousands of dollars; besides that many smaller mines are paying handsome dividends. Poor men have come here without money, located claims and commenced shipping ore from the surface. Some of the surface bunches have been dug out, others are being worked to a depth of 60 and 80 feet with good ore going down. If the ledges "go down" the camp is a bonanza, and will be a great gold producer, but until more development work has been done mining men will be slow to invest.

ANDREW F. ROSENBERGER.

Randsburg, Cal., Dec. 16th, '96.

Placer Gold Mining in Eastern Oregon.

Having just returned from a trip up Snake river, perhaps some of the items of information gathered in regard to the fine gold placers of that section may be of interest to your readers.

We stopped off at Ontario, a small but thriving town on the Oregon side in Malheur county. Situated as it is in a valley about ten miles wide, much of the surface as level as floor, it seems a most unlikely place in which to find gold, nevertheless it is there, distributed up and down the valley for hundreds of miles; though as Missouri Jake used to say, "it is more than half gravel." In some places the miner or prospector in search of a "grubstake," may rock out from $1.00 to $3.00 per day. These pay streaks are usually found about the upper ends of the islands and the bends in the river. In some places bars several hundred feet from the river are stripped and the pay gravel hauled to the river and washed The overlay is a sandy loam, generally about 5 or 6 feet deep, and produces good crops of hay, grain and potatoes, with irrigation. When the crops are harvested, many of the farmers along the river commence mining, gathering gold beneath the same ground from which they may have taken a crop of potatoes a few weeks before. The plant most generally used for washing the gravel, consists in part of a horse-power Chinese pump, from which the water is led to a shallow box about 3 feet square, the sheet iron bottom of which is perforated with about one-quarter inch holes. These serve to distribute the water over a finer screen placed at an incline of about 35°.

The holes in this incline screen are about one-sixteenth of an inch in diameter, about sixteen to each square inch. Over this screen the gravel slides, being assisted by the water falling over it from the screen above, which washes the fine sand and gold through it, whence it falls from 2 to 5 inches upon an amalgamator or silver-plated copper table, set on inclination of about 2 inches to a foot. Upon these tables the greater part of the free gold is caught; the tailing being run through a blanket or burlap sluice to save what may have escaped. Some dispense with the Chinese pump by bringing in water from the irrigation ditches, thus cutting down expenses considerably. It is a cheap and simple device and when not overcharged saves the gold quite effectively. Its capacity is from fifteen to twenty cubic yards per ten hours. There have been numerous attempts made to winze gravel from the bottom of the river by means of hydraulic dredges, but, so far, these experiments seem to have resulted in failure, as the mill and dismantled boats and scows tied up along the river will testify. We noticed a rocker being industriously worked almost under the stern of one of these machine boats, which it is reported had cost over $25,000. It secured a sarcastic rebuke to some one's mistake and mismanagement. Those who stick to the banks and bars seem to be meeting with encouraging results and are in a fair way to solve the problem of working the pay gravel upon a large scale. We went up the river about fifteen miles above Ontario, and found considerable work going on with the machine above described. We regretted that limited time would not admit of our going farther, as we were informed a Mr. Singer, a son of the famous sewing machine inventor, was operating upon a bar a few miles above with satisfactory results. It would seem that as long as the gravel will pay to rock or work with the crude appliances now in use, there should be some way of working it upon a large scale profitably. The gravel varies greatly in value; assays from a claim below Ontario running all the way from 14 cents to $8.41 per cubic yard, the last being from a narrow pay streak, but the greater part of the workable gravel will go from 50 cents to $1.00 per cubic yard in free gold, besides what is contained in the black sand. The magnetic sand contains little value, but it is associated with a non-magnetic iron sulphide, which is said to assay well, some claiming as high as $200 and $300 per ton. Be this as it may, they are certainly worth a careful investigation and a saving of the gold they contain may go far toward solving the problem of the profitable working of the fine gold placers of Snake river. WM. W. WASHBURN.

Baker City, Or., Dec. 15, '96.

Costs of Milling and Mining.

To those opening up mines, data as to the cost of milling, mining, sinking of shafts, running of tunnels and other work in any mining district is of great importance, and is always sought for before making estimates as to the value of a property and as to how it should be worked. In Africa, and in fact in nearly every mining field where British operators predominate, there is an abundance of this data obtainable. In this country, however, much less attention has been paid to this question. The State Bureaus and the United States Geological Survey have done considerable good work in this direction; but they have been handicapped by the disinclination on the part of a great many mine owners to impart such information. Reports from large and well-managed mines that go into the details, giving items of cost, are of great value in making calculations.

The cost of milling and mining—milling especially—depends not entirely upon the cost of the actual necessary items, but the manner in which the work is managed. A mill that is run steadily and to its fullest capacity will often show a great difference in the cost from another working under similar conditions, but in which there is not the same care in its management. The closing of the mill or the hanging up of part of the stamps will much more largely increase the cost than is generally supposed. Stopping half the stamps in an ordinary mill means the doubling of the cost per ton generally for superintendency, for taxes, for insurance, for office supplies and other smaller items, and for a large part of the labor, water and wood. These items make up in all from 40 to 60 per cent of the running.

There are many mills in this State in which preparations and proper precautions are not taken to reduce the stoppages to a minimum. A little extra cost in keeping on hand all the necessities for making repairs and constant and careful watching of the machinery would often reduce the present cost per ton considerably. Then, care is not always taken to keep the mill constantly supplied with ore from the mine.

It is the purpose of the MINING AND SCIENTIFIC PRESS to publish from time to time data as to the cost of milling, mining, sinking shafts, running tunnels, etc., obtained from representative mines of different districts.

The following data furnished by John Ross, Jr., superintendent of the Wildman and Hector mines at Sutter Creek, Amador county, with mills of thirty and forty stamps respectively, show what may be accomplished by skillful and careful management in well equipped properties.

DETAILED AVERAGE COST OF MINING ONE TON OF ORE AT THE WILDMAN MINE, SUTTER CREEK, 1895. JOHN ROSS JR., SUPERINTENDENT.

	Cost Per Ton, Cents.	Total Cost for 31,591 Tons.
Timbers	16.0	$ 5,046.20
Spiling	4.8	1,532.98
Lumber	2.2	687.57
Charcoal	1.7	539.35
Candles	2.1	656.25
Powder	4.8	1,533.65
Fuse	1.1	352.05
Caps	0.2	62.00
Water for Power	9.9	3,119.45
Freight	2.9	916.81
Iron	1.1	337.62
Steel	0.7	231.18
Hardware	2.4	765.66
Oil	0.8	249.66
Grease and Tar	0.2	67.12
Coal	0.2	76.00
Miscellaneous	3.4	1,067.66
Surveying	1.3	223.37
Power Drill Machinery	3.2	1,026.50
Wire Rope	0.7	223.24
Insurance and Taxes	1.1	352.37
Office and Assay Supplies	0.5	140.61
Pump Repairs	0.7	209.80
Superintendence and Labor	140.1	44,248.97
Total	202.1	*$63,847.40

*The above cost includes all repairs, equipment and diamond drill development and development work, cost of operating rock breaker and delivery of ore in ore bin, in mill.

DETAILED COST OF MINING ONE TON OF ORE AT THE WILDMAN MINE, SUTTER CREEK, FOR YEAR ENDING SEPT. 30, 1896. JOHN ROSS JR., SUPERINTENDENT.

	Cost Per Ton, Cents.	Total Cost for 33,497 Tons.
Timbers	18.6	$ 6,255.80
Spiling	6.1	2,031.55
Lumber	2.0	691 46
Charcoal	1.9	632.40
Candles	1.6	556.90
Powder	5.0	1,661.37
Fuse	0.9	291.33
Caps	0.2	62.05
Water for Power	9.8	3,297.25
Freight	1.6	528.76
Iron	1.2	408.15
Steel	1.3	433.79
Hardware	2.8	929.31
Oil	0.8	252.01
Grease and Tar	0.1	35.30
Coal	0.2	77.11
Miscellaneous	5.7	1,894.13
Power Drill Machinery	2.6	834.75
Pump Repairs	1.9	637.60
Surveying	0.6	212.50
Taxes	0.8	247.50
Water Pipe	0.2	59.05
Insurance	0.4	128.77
Wire Rope	1.2	392.70
Superintendence and Labor	149.4	50,068.82
Total	216.8	†$72,640.36

† The above cost includes all repairs, equipment and development work, cost of operating rock breaker and delivery of ore to mill; also cost of operating and repairs on pump.

DETAILED AVERAGE COST OF MINING ONE TON OF ORE AT THE HECTOR MINE, SUTTER CREEK, FOR THE YEAR ENDING SEPT. 30, 1896. JOHN ROSS JR., SUPERINTENDENT.

	Cost Per Ton, Cents.	Total Cost for 41,846 Tons.
Timbers	15.1	$ 6,340.05
Spiling	3.6	1,470.42
Lumber	0.8	338.38
Charcoal	0.9	379.63
Candles	1.6	670.70
Powder	4.0	1,703.40
Fuse	0.8	284.87
Caps	0.2	68.30
Water for Power	5.6	2,331.45
Freight	1.1	443.05
Iron	1.2	488.18
Steel	1.0	409.47
Hardware	2.2	915.45
Oil	0.5	208.34
Grease and Tar	0.1	42.56
Coal	0.2	75.08
Miscellaneous	3.0	1,241.40
Power Drill Machinery	1.7	746.09
Surveying	0.5	210.00
Cement		15.00
Insurance	0.1	32.12
Taxes	0.1	156.88
Superintendence and Labor	110.0	16,065.75
Total	154.6	$64,715.15

The above cost includes all repairs, equipment and diamond drill work development, cost of operating rock breaker and delivery of ore at mill; also of hoisting 49,756 skips or 89,521 tons of water.

DETAILED COST OF MILLING ONE TON OF ORE AT THE WILDMAN MINE, SUTTER CREEK, 1895. JOHN ROSS JR., SUPERINTENDENT.

	Cost Per Ton, Cents.	Total Cost for 31,591 Tons.
Shoes	1.9	$ 614.25
Dies	1.5	475.05
Screens	0.4	124 74
Quicksilver	0.6	184.65
Wood	0.3	104.28
Hardware	0.4	136.86
Belting	1.1	338.16
Water for Power	9.4	2,964.30
Freight		21.95
Lumber		10.01
Oil	0.2	15.00
Grease and Tar		5.35
Cyanide of Potassium	0.3	95.85
Miscellaneous	0.6	191.33
Assay Supplies	0.2	87.02
Office Supplies	0.2	53.60
Express on Bullion	0.5	166.27
Hauling Sulphurets	1.6	496.32
Insurance	0.4	128.13
Taxes	0.7	224.25
Superintendence and Labor	16.1	5,087.07
Total	36.4	$11,525.04

The above cost includes all costs and equipment.

DETAILED COST OF MILLING ONE TON OF ORE AT THE WILDMAN MINE, AT SUTTER CREEK, YEAR ENDING, SEPT. 30, 1896. JOHN ROSS JR., SUPERINTENDENT.

	Cost Per Ton, Cents.	Total Cost for 33,512 Tons.
Shoes	1.8	$ 628.80
Dies	1.1	370.60
Screens	0.3	108.39
Quicksilver	0.7	240.71
Wood	0.2	75.37
Hardware, Iron and Steel	1.3	435.16
Belting (Concentrator)	0.6	199.48
Water for Power	9.5	3,188.70
Freight		72.53
Cyanide of Potassium	0.6	81.00
Oil		14.85
Grease		5.06
Miscellaneous	0.7	223.53
Lumber	0.8	262.88
Assay Supplies	0.5	152.04
Office Supplies	0.3	105.20
Express on Bullion	0.6	185.14
Hauling Sulphurets	2.0	702.22
Taxes	0.8	247.50
Insurance	0.2	59.38
Silver-plated Plates	0.7	244.02
Water Pipe and Connection	2.1	718.40
Superintendence and Labor	16.0	5,389.06
Total	40.8	$13,699.96

These costs include all repairs and equipment.

DETAILED COST OF MILLING ONE TON OF ORE AT THE HECTOR MINE, AT SUTTER CREEK, FOR THE YEAR ENDING SEPT. 30, 1896. JOHN ROSS JR., SUPERINTENDENT.

	Cost Per Ton, Cents.	Total Cost for 41,771 Tons.
Shoes	1.8	$ 749.71
Dies	1.6	681.31
Screens	0.4	177.57
Quicksilver	0.7	293.03
Hardware	0.8	317.65
Water for Power	7.8	3,252.60
Freight	0.8	346.66
Cyanide of Potassium	0.2	73.50
Wood		28.50
Charcoal, Iron and Steel		30.26
Oil	0.2	21.75
Grease		5.68
Lumber		10.50
Miscellaneous	1.1	462.58
Assay Supplies	0.4	152.04
Office Supplies	0.2	105.19
Express Charges on Bullion	0.2	93.21
Hauling Sulphurets	2.2	935.32
Taxes	0.5	196.86
Insurance	0.4	118.76
Plates	0.2	86.49
Superintendence and Labor	12.3	5,151.62
Total	31.8	$13,290.73

Mining Prospects in Wyoming.

A good deal of interest is manifested in mining in this vicinity. Besides the strike made at the Grand Encampment creek in Carbon county, the mining property of James Douglas in the Sandstone district, about forty miles south of Rawlins, has developed unexpected richness. He has had a 300-foot tunnel driven on one of a group of his claims in that district, and has struck a 3-foot lead which runs nearly parallel with the tunnel, assaying $154\frac{10}{100}$ ounces in gold and $18\frac{20}{100}$ ounces in silver to the ton. Mr. Douglas has ample private means and will prosecute work on the claim vigorously, and by next spring will have on hand the necessary machinery to handle the ore.

In the Grand Encampment district Messrs. Chatterton and Kurtz, who were the original locators in this district, have driven a tunnel 1000 feet into the mountain and are now within 100 feet of the main lead. This tunnel already cuts one lead upon which was first sunk a shaft 50 feet and a drift 40 feet, the vein being 3 feet wide and running 20% copper and from $4 to $8 in gold. It also cuts a blind lead 3 feet wide which runs 14% copper and $12 gold. They have during the past fall sunk a 90-foot shaft upon the main lead, which is 40 inches wide and assays $40 in copper and gold, and are preparing to drive a tunnel to tap this lead at a depth of 300 feet. These gentlemen have thus far spent some $16,000 in developing the property, but it is estimated that there is enough ore on the dump to more than repay them.

Some fine specimens of ore taken from the Clara May, Florence and Ethel May claims have been on exhibition at the office of the Rawlins Mining Exchange. Creed McDaniels and M. W. Dillon, owners respectively of the Druggist and the Exchange, have shipped specimens of ore for assay. The best, however, of the latest specimens from the Grand Encampment has come from the Virginia and Belle Platte claims owned by Messrs. Osborne, Kurtz and Landon. On breaking open a piece of the Virginia ore it was found to contain chalcopyrite and cuprite which runs 30% copper and carrying gold and silver.

The Peggy D. Mining Co. has incorporated at Rossland; capital stock $250,000, to develop the Bessie P. and other claims in the Grand Encampment.

The Upper Platte Valley Gold Mining Co. has also filed articles of incorporation. Capital stock $1,000,000, and headquarters at Saratoga, Wyo. They will operate principally in the Grand Encampment country.

Tunnels are being driven in the Golden Eagle, owned by A. H. Huston, and it is expected to strike the lead at 300 feet.

P. Paulson, who has been developing his copper properties near Rawlins, has opened a vein which indicates that both copper and silver in paying quantities will be found.

The Rambler mine, at Battle Lake, Carbon county, has taken out 125 tons of copper this summer. The facilities for doing this work have been very poor, and all the ore has to be hauled by teams some 25 miles to a railway station, and 70 tons are now at Walcott, on the Union Pacific, awaiting transportation. ROB'T. JOHNSTON.

Rawlins, Wyoming, Dec. 19th, '96.

About Saving Gold in the Mills at the Rand, South Africa.

Having repeatedly seen statements in your valuable paper of the gold recovered from batteries, plates, concentrators and the cyanide process at the South African mines, it seems strange that those accounts have not been more thoroughly discussed and looked into by mining men of California. As the ore or conglomerates of the Rand seem to be hard and free of sulphuretes, and the gold therein bright and of an amalgable character, they save a small per cent in the batteries or mortars and on the plates, and have recourse to the cyanide process so extensively, to recover a large per cent of gold lost in the mortars and on the plates. Their labor is cheap, as they employ Kaffirs, but it appears evident they are taking out their best ore now, and that it is only a question of a few years when those mines will be closed down.

As an experienced miner and millman, it seems to me that if they would pay more attention to their amalgamation and do away with much expense, it would be better. As all practical miners, as well as theoretical ones, must admit the quicker you save the gold after it leaves the rock or matter crushed the better, and the further it gets away from the batteries and mill the more difficult and expensive. If in free amalgamating ore you can save all the gold in the mortars and plates, it would be the cheapest and surest. I saw, some time ago, where, at a certain place, they took some $8000 from plates in hard amalgam by "buckling or bending" the same, which shows that their style of amalgamating must be imperfect, as plates should never be allowed to get so hard under the eye of a competent amalgamator. The mill being the place that is looked to for expenses and profits, this matter is important. Of course, so long as they have plenty of good rock, this will not be severely looked into. But the day of reckoning must come, as their veins are narrow, from one to four feet wide.

There are two things to be considered in this matter. One is that the crushing capacity of the stamps has been exceeded by forcing four and one-half tons to the stamp through a battery in twenty-four hours, as they do in South Africa, this being a very large amount; or that the amalgamators do not bestow proper care. All gold that is free in the vein matter crushed can readily be amalgamated, be it "brown or rusty," even, as in the mine that I have been connected with for years the bulk of the gold is "brown or rusty," and we have no difficulty in saving 90 per cent in the mortars and on the plates. Of course, all appliances for saving gold are necessary adjuncts and safeguards to a mill.

I have been induced to write this little article from the fact that gold mining must come to the front again in California as one of the principal industries, and anything that will increase the yield of gold and decrease the expense in our low grade ores should be carefully looked into, as San Francisco and California have tried to live on agricultural, horticultural and viticultural products and found them insufficient to make business thrive.

Some of the old mining counties now almost deserted afford sufficient room to employ a very large population to good advantage. G.

San Francisco, Dec. 19th, '96.

THE Alameda, Cal., County Miners' Association has a new departure worthy of emulation by other county associations. It has decided to hold meetings about once a month when the members will be addressed on some topic of interest to miners. Among the subjects proposed are: "The Cyanide Process," Professor S. B. Christy; "Auriferous Gravels of California," Charles B. Yale; "The Mother Lode," H. W. Fairbanks; "Quartz Mining," E. H. Benjamin; "Electric Power in Mining," F. W. C. Hasson. Following these lectures there will be discussions of the several topics.

Scientific Progress.

Imitation in Nature.

It is a well known fact that most, if not all, animals partake of the color of their surroundings, those inhabiting mountainous or flat regions having coats of solid color similar to the rocks or plains, while those living in the forest usually wear striped or mottled suits. The camel and lion are sand colored, the polar bear white, like the eternal snows among which he lives, and the wolf, the mole and the nocturnal rat, all of which prowl about by night, wear neutral colored habits. The lizards, snakes and grasshoppers, which live in the sand, are gray or brown, while their brethren of the trees and grass are green.

The spots of the leopard may be mistaken for flecks of light between the foliage of his forest home, and the stripes of the tiger for the reeds of his native jungle. An interesting mode of deceit used by the tiger is his hunting call, which so resembles the loud whistle of a deer that only an expert can distinguish between them, and the deer themselves respond to it.

An African traveler has described the coat of the zebra as a "thunder and lightning pattern," and asserts that, instead of rendering the wearer conspicuous, it makes him quite the reverse, "the white stripes appearing like bars of light between the trees."

Some animals change their suits to match the season, while the colors of others vary to harmonize with the objects upon which they rest. Of the former class are the Arctic fox, the variable hare and the ermine, all of which lay aside their coats of gray and don one of pure white when the snows of winter come. Familiar illustrations of the latter class are the chameleon and tree toad.

Among the birds are many examples of protective coloring. The woodcock folds his conspicuous tail under his Quaker garb and becomes invisible, so well do the colors of his plumage harmonize with the fallen leaves.

The sand grouse of the desert are so like the sand that even when running it is almost impossible to see them.

The ptarmigan of Scotland, on its bed of heather and lichens, is indistinguishable; and when winter approaches this bird changes his plumage to pure white, and so resembles his snow-covered heaths. The partridge in a plowed field is most inconspicuous, the spots on his feathers appearing like the lumps of earth and shadowy interstices.

Machinery vs. Brains.

The skilled workman of to-day is as much a product of the times as the machines he is so largely occupied in tending, and though the operative of to-day may be individually as intelligent, and undoubtedly far better educated, and an all-round better citizen than his predecessor of a previous generation, yet, so far as his actual work is concerned, brain power is being practically superseded by steam power.

I make this rather sweeping statement deliberately and with a sincere conviction that, disguise it how we may, while our machines are becoming almost human, nay, almost superhuman in their powers, the workman himself is, as a matter of fact, more and more nearly approximating to the condition of an automaton—a wage-earning machine. He is living upon the brains of dead-and-gone inventors, pioneers of mechanical industry, like Maudsley and Bramah and Whitworth. The mechanic of the present day gets through his day's work without the necessity of exerting himself to more than the most trifling extent, either bodily or mentally. I quite admit that this is a gain, on the whole, for all the parties concerned; for the workman, because, though his work is lightened, he earns better wages and is at liberty to devote his intelligence to doing good for himself in other ways—his status is raised; he has time and opportunity for rest and rational recreation; his day's work is not, as formerly, his day's sole occupation. It is a gain, too, for his employer. A single man's production is now from five to fifty times what it was in the early days of mechanical engineering. It is good for the community at large—directly, because the increased facility of production lessens the price at which good articles may be purchased, and, indirectly, because the man, relieved from exhausting toil, is a more valuable citizen than he who has no leisure to devote to the improvement of himself and his fellows.

I must not, therefore be understood as conveying a reproach when I assert that the mechanic of the period has his mental as well as his bodily labor performed for him.—Cassier's Magazine.

Rails of Wood Pulp.

The successful introduction of railroad rails made entirely from paper material in Germany and Russia, has encouraged American manufacturers to experiment. The foreign mode of making the rail consists in the employment of molds and powerful pressing machines—the former for shaping the rail and the latter for consolidating purposes. Paper car wheels have been in use for many years and have given satisfaction.

The heavy locomotives and other rolling stock of these days require extraordinarily large and heavy rails; consequently, the rails cannot be made very long, as the weight would be too much. The paper rails are less than one-half lighter for the same length and size; so that, so far as the weight question is concerned, the length of the latter can be twice that of the iron or steel rail. This obviates the use of just so many joints, dispensing with many bolts and connections, and relieving the wheels of the car from just so many shocks.

The process of manufacturing the rails is not difficult when once the necessary compression apparatus is available, as the solidifying operation is probably the main part of the work. The composition of the rails includes several varieties of paper pulp stock. Wood pulp has not been tried with any marked success as yet, but ordinary pulp from rags, rope stock, etc., answers the purpose. The processes of grinding, cooking, digesting and working of the rags into a pulpy condition are accomplished in regular order, care being taken to have the stock uniform in preparation and the fiber as well preserved as possible. When in a pulpy condition, the ingredients for stiffening the rail rendering it tough and efficient, so as to stand excessive wear and friction from the wheels, and for imparting elasticity, smoothness and other needed requirements, are applied. So varied have these been that no definite portions of any of the substances are procurable.

Quantities of borax, litharge, paraffine wax, tanners' grease, waterproof fish glue, rosin and fine cement are employed in necessary proportions, and are added to the pulp while it is yet warm. Mixing follows, and the ingredients are thoroughly combined with the fiber. A quantity of shellac and wood alcohol is next put into the mixture, and the mass is subjected to another stirring and then permitted to settle.

The paper rails are strong, durable, can be bent for curves like other rails, and possess the advantages of lightness and increased length, besides being easier for the wheels and cars, and having other points of superiority. Their cost is said to be 30 per cent less than that of steel. They are adaptable for both paper and iron car wheels.

DR. NANSEN, baffled in his attempt to reach the North Pole, although he got nearer to it than any one else has ever been, reports a fact which upsets some old ideas about the Polar sea. He found that the sea north of Siberia is shallow in its southern portion, averaging only 90 fathoms deep, but that above latitude 79° it suddenly becomes profound, the bottom falling to a depth of from 1600 to 1900 fathoms. If this applies to the entire polar basin, then the North Pole does not lie in shallow water, as many have supposed, but is situated in the midst of a deep sea—a fact which has a bearing upon the problem of how best to reach the pole.

EXPERIMENTS have lately been made by the physiological department of Yale University on the influence of alcoholic drinks upon the chemical processes of digestion. The investigations were made by means of artificial digestive experiments, in which the digestive fluids were allowed to act upon the various food substances under definite and constant conditions. Absolute alcohol in four cases appeared to actually stimulate digestive action by a fraction of 1 per cent, but the amount of alcohol present did not exceed 1 or 2 per cent. Whenever alcohol was added in quantities over 2 per cent, digestive activity was markedly checked; in one instance 3 per cent of alcohol reduced the digestive activity by 17.6 per cent. Pure rye whisky containing 5 to 51 per cent of alcohol yielded practically the same results; even an addition of 1 per cent of this spirit was found, taking the average of the experiments, to reduce digestive activity by over 6 per cent. In three cases, however, an increase in digestivity of from 3 to 5 per cent were recorded when additions of whisky in the proportion of from 1 to 3 per cent were made. Brandy, rum and gin gave practically the same results. Whisky can be considered to impede the solvent action of the gastric juice only when taken immoderately and in intoxicating quantities.

IT is well known that men and women need change of air, but about the reason why they need it there is no agreement of opinion. A new theory upon the subject is advanced by Dr. Louis Robinson. From the assumption, which in itself is plausible enough, that the original progenitors of the Indo-Germanic peoples were nomads or wanderers is drawn the inference that an occasional removal from place to place is craved by a deep-seated hereditary instinct. There is no doubt about the fact that a change of air is beneficial not only when the change is from bad to good, but from bad to bad of another kind. A resident of Rome, for instance, will often find his health improved by removal from the finest quarter of the city to the Ghetto, where malodorous as the district is, the Roman fever seldom penetrates. Dr. Robinson cites the case of an English sufferer from asthma and bronchitis, whose home was in a healthy part of the suburban country, Surry, but who obtained very great relief from a sojourn among the slums of the Seven Dials. Many other examples might be given to show that mere change, irrespective of the qualities of the atmosphere exchanged gives a fillip to the system and increases its recuperative power.

A MEMBER of the United States Geological Survey has just calculated the height of Mt. Rainier, Wash., at 14,519. It has heretofore been placed at 14,444, while that of Mt. Shasta, Cal., is 14,440.

Electrical Progress.

IN a recent lecture Jas. Swinburne gives a quaint account of a scientific wild-goose chase in which he had been engaged when attempting to formulate a commercially successful process for extracting the tin from tin scrap. It has long been held as an article of faith among the disciples of "waste products" that the utilization of scrap tin was a matter which involved possibilities of pecuniary gain. Accordingly Mr. Swinburne set himself to discover a means whereby the extraction of this metal might be profitably accomplished. As the result of his researches he devised an electrolytic process which accomplished the theory. The problem was solved, and all that remained to do was to get large quantities of scrap and then make a fortune. But alas! there was no scrap to be had. In fact there is none. The cost of collection is far too great ever to afford the remotest prospect of this new industry coming into existence.

THERE is a revolt in England against the Government management of the trunk telephone lines because of the obstructions which prevent immediate communication. If a man in London wishes to speak with a man in Liverpool he calls up his own central office and makes known his desire. The operator there transmits the request to the general post office in London. That office, when it gets ready, communicates with the general post office in Liverpool, and thence to the local telephone exchange in the latter city, and finally the desired subscriber is reached. Under the old system such connections did not require more than two minutes. The Government seems to be unable to accomplish it in less than twenty-five minutes, and often a much longer time is occupied.

AT the Central Indiana Hospital for the Insane at Indianapolis the equipment of the laundry with electrically heated sadirons has reduced the number of employes at the ironing tables nearly one-half. The reasons why such results are possible are that the electric irons are constantly supplied with a uniform amount of heat, nearly all of which is absorbed by the work, and by reason of the constant supply every rub is equally efficient. There being no appreciable heat radiated from the iron, it is apparent that in a room where the temperature can be regulated, and there is no vitiation of the atmosphere due to combustion, much more work can be accomplished.

A NEW syndicate, with practically unlimited capital, is reported formed in Chicago to engage in the telegraph and long-distance telephone business, composed of New York, Philadelphia and Chicago men, whose plan is to connect about 1000 independent telephone exchanges by long-distance wires, to penetrate other territory rapidly, and to keep on building until all the States and Territories are wired. "Telegraph and long-distance telephone services at a popular living rate" is the promise of the promoters. The territory of the American Telephone & Telegraph Company, or long-distance Bell Company, will be invaded at every point.

THE Boston Terminal Company, which is constructing the new Union station, contemplate a new departure in railroading. Their plans provide for the joint handling of electric and steam traffic. In some respects the new station may be considered as being an electric road station, for it will provide for the handling of the suburban traffic south of Boston, amounting to hundreds of millions of passengers annually, by means of electric trains.

A BERLIN SCIENTIST has ascertained by experiment that a number of persons who use the telephone habitually hear better with the left ear than with the right. To educate the right ear to the same point he recommends holding the instrument in the right hand half the time. The common practice of the telephone companies is to place the receiver so that it will be applied to the left ear.

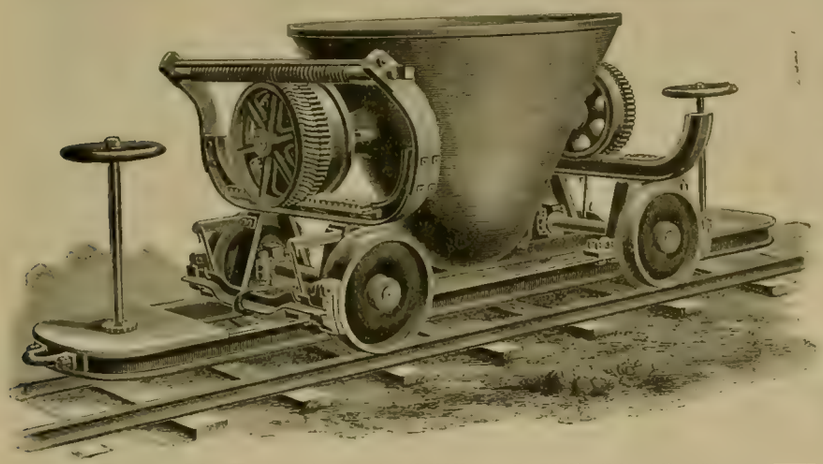
PARIS will soon have a trolly line. Before a late meeting of the General Council of the Seine was a proposal to work the tramway between the Bastille and Charenton by electricity. Some opposition to the use of overhead wires was manifested, but finally the council decided to accept the offer of the tramway company to construct at their own expense.

THE submarine cable between New York City and Hayti was completed on the 1st inst., and opened for business the same night. The injunction suit against this cable line, brought by the Attorney-General of the United States on the ground that it was a foreign enterprise, is still undecided, Judge Lacombe having the matter under consideration.

Mechanical Progress.

Disposing of Slag at Smelting Plants.

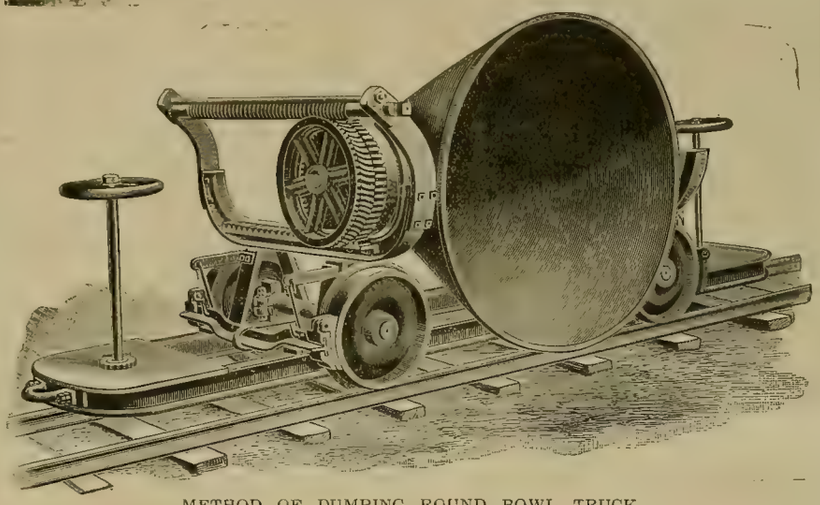
The disposition of molten slag at smelting plants is of importance in furnace practice. The longer the plants are in operation the larger and wider grow the slag dumps of necessity, consequently removing the dumping grounds farther and farther away from and less accessible to the furnaces, rendering the handling of the slag by the ordinary hand slag-pot carts very inconvenient and laborious. The necessity for an improved and quicker method of disposing of slag from furnaces caused the Colorado Iron Works of Denver, Colo., to devise and patent a truck or car to run on a track, carrying two bowls, which proved a success. That company has since devised two other trucks based on the same principle, carrying one bowl each, but of much greater capacity than the double bowl truck, to meet the varying conditions at the different smelters. These are made of iron and steel throughout, thoroughly strong and rigid to withstand the rough usage to which they are subjected and many of them are in use at various smelting plants throughout the country. In some cases they are drawn by locomotives; at others, by mules and horses; or at other smelters they are handled by cable and stationary winding engine.



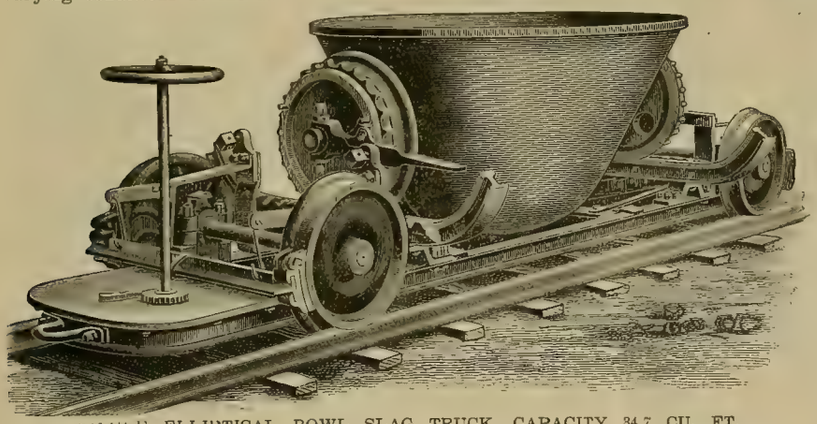
SINGLE ROUND BOWL SLAG TRUCK, CAPACITY 35.16 CU. FT.

The success of the double bowl truck occasioned a demand for a truck of greater capacity and the one shown in the first two illustrations on this page was designed to supply this want. It has a capacity of 35.16 cubic feet and measures 4 feet 7 inches from top of track to top of bowl. As the cuts show the style of the truck perfectly, a detailed description is unnecessary. The bowl is suspended or hung on trunnion axles on which are keyed wheels that roll on a track placed transversely of the truck. A screw gear is also keyed to one of the trunnion axles of the bowl and a screw extending across the frame operated by a hand crank and fixed in boxes at its two ends, engages in the gear, revolves it and the bowl is thus rolled over on its wheels far enough to pour out all its contents over and beyond the track. It is fitted with platform and brake wheel on one end for use on the grades when necessary. The length of this truck over all is 13 feet and 6 inches, width 6 feet, and weighs complete about 6300 pounds.

Some smelters require a truck of large capacity but not exceeding in height the double bowl truck. To meet that demand the Denver company furnishes the truck illustrated in the last two cuts on this page. It consists essentially of a single elliptical-shape bowl suspended by trunnions on a pair of flanged wheels. These wheels traverse a track placed transversely of the truck, seventeen inches each way from the center, and when in dumping position the bowl extends over and outside of track rail 12 inches. The trunnions of the bowl are so placed with reference to the center of gravity, that when empty the bowl will drop back and stand right side up in position, ready for receiving slag. When loaded the center of gravity is immediately above the center of the trunnions and the bowl can be easily dumped or rolled over by being given a slight push out of the center line of gravitation; and when thus relieved of its contents it returns to its upright position by reason of the center of gravity now being below the center of trunnions. The dumping and returning, as well as retaining the bowl in its normal position, are entirely regulated by means of suitable brakes.

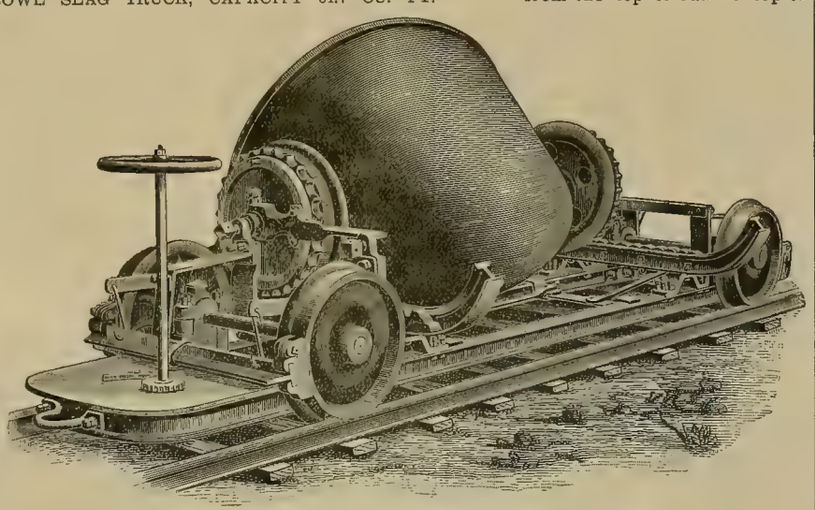


METHOD OF DUMPING ROUND BOWL TRUCK.



SINGLE ELLIPTICAL BOWL SLAG TRUCK, CAPACITY 34.7 CU. FT.

The height is 3 feet 3 inches from the top of rail to top of bowl. It is 15 feet 5 inches long and 5 feet wide over all, and weighs ready for shipment about 6500 pounds.



METHOD OF DUMPING ELLIPTICAL BOWL TRUCK.

Aerostatic Railway.

A balloon is to be the propelling power used in carrying passengers to and from the top of the Hochstauffen mountain, at Bad Reichenhall in the Austrian Alps. This aerostatic railway is the invention of Engineer Volderauer. A local body of engineering experts has said that the scheme proposed is feasible and safe. On this recommendation the local authorities have sanctioned the road's construction to the mountain. The power by which visitors are to climb this mountain is furnished by a captive balloon. This runs along a track built at the side of the roadbed. A trailer, furnished with many wheels, clasps this wooden rail, and to this trailer the passenger car is fastened. The operator has a seat in the car, and a cord swings between his place and the balloon, by which the gas supply is regulated. He has also several brakes and safety devices at hand in case of accident. At the foot of this unique railroad is a gas tank and generator. Gas is made here to illuminate the town, and also for the purpose of filling the balloon. A charge sufficient to carry the car to the top of the mountain is given it at the start, and when the grade has been mounted, and all is ready for the return down the mountain, a small quantity of gas is released, and the car starts down, its rapid descent being checked by the gas that has been allowed to remain in the balloon. Permission to construct the aerostatic railroad was granted only after the most searching investigation had been made of the plans. There are many novel safety devices to prevent any serious accidents.

Firing a Canon Under Water.

A curious experiment was recently made with a piece of ordnance at Portsmouth, England. A stage was erected in the harbor within the tide mark; on this an Armstrong gun of the 110-pound pattern was mounted. The gun was then loaded and carefully aimed at a target—all this, of course, during the time of low tide. A few hours later when the gun and the target were both covered with water to a depth of six feet, the gun was fired by means of electricity. We said "aimed at a target," but the facts are that there were two targets, but only one was erected for this special experiment, the other being the hull of an old vessel, the Griper, which lay directly behind the target and in range of the ball. The target itself was placed only 25 feet from the muzzle of the gun. It was composed of oak beams and planks, and was 21 inches thick.

In order to make the old Griper invulnerable, a sheet of boiler plates 3 inches thick was riveted to the waterlogged hull, in direct range with the course the ball was expected to take if not deflected by the water. On all of these—the oaken target, the boiler plates and the old vessel hull—the effect of the shot from the submerged gun was really startling. The wooden target was pierced through and through, the boiler iron target was broken into pieces and driven into its "backing," the ball passing right on through both sides of the vessel, making a huge hole, through which the water poured in torrents. The experiment, apparently, demonstrated the feasibility of placing submerged guns in harbors in time of war.

In the motor carriage race from Paris to Marseilles and back the distance was 1070 miles. The fastest vehicle made this in 67 hours 42 minutes and 58 seconds. The average was 15.85 miles per hour. All the competing carriages had benzoline motors.

Nearly all the machinery for the manufacture of boots and shoes, throughout the world, is of American invention.

Mining Summary.

CALIFORNIA.

Amador.

Dispatch: The shaft at the Anita is down 530 feet. It is like all the other shafts in the district, having three compartments. A crosscut was run eastward 75 feet from the 500-foot level to the ledge and the managers are now drifting north and south on the ledge, and quartz is being taken out that assays very well.

At the Jackson Gate they are drifting eastward from the shaft on the 300-foot level.

Ledger: M. Bearce has secured the Poker Bill mine, near the Contrares, and intends to open it up by tunnel.

Calaveras.

Chronicle: At the Mitchell mine, near Railroad Flat, the shaft is down 80 feet and will be put down to 500. The main tunnel is in 450 feet, and there is a continuous ledge the entire length. The 10-stamp mill will be ready for operation in a few days.

Citizen: Stockton men have a bond on the Benson quartz mine, near Central Hill, and will begin operations at once.

At the Emerson, near Mokelumne Hill, a double compartment shaft is being sunk between the two parallel ledges, which are about 100 feet apart. The machinery on the mine is capable of sinking to a depth of 1000 feet.

Mountain Echo: The Parnell mine is about to pass into the hands of a company, under a year's bond.

The Bald Hill mine is freed from water, awaiting parties who are to examine the property with a view to purchasing it.

The Coddington mine, on the Dead Horse lode, has been leased to Messrs. Mercer & Huston, and work on a small scale will be commenced on the mine shortly.

At the Lightner mine a three-compartment, 7x14 shaft is being sunk; at the Great Western the shaft is down 80 feet and will be sunk deeper; at the Ghost mine the shaft is down 300 feet and it is the intention of the company to sink to nearly 2000 feet before opening up a general system of stoping; a shaft is being sunk on the Koolah and a new shaft on the Utica. Besides these, there are a number of other shafts being sunk or in contemplation.

Angels *Voice*: The Thorpe Mining Company will sink 200 feet further this winter and in the spring will probably put up a mill.

On the Melones property the work of enlarging the old shaft to three compartments is approaching completion.

The new shaft of the Utica is down about 70 feet. Three Burleigh drills are being used.

The mill at the Gwin is running on rock from the dump and shaft, as stoping has not begun.

Fresno.

The *Republican* reports the sale of the Copper King mine to an English syndicate by Hugh Knepper. The mine is thirty miles north of Fresno. The ore occurs in three forms—black oxide, sulphite and carbonate. The first named predominates and is the richest. A recent assay of the oxide, taken from where the ledge is 28 feet wide, showed 37 per cent of copper, $9 per ton in gold and some silver. The oxide will average from $75 to $80 a ton in all, and some of it goes as high as $12 in gold.

A tunnel, 450 feet long, has been cut through from one ravine to another, following the apex of the ore body, which lies in large swells, showing a width of from a few feet to as high as 28 feet. Two shafts have been sunk, one to the depth of 82 feet, and the other 40 feet. In the former a crosscut was made at 60 feet, where the miners found nearly 13 feet of ore. It is estimated that the new company will develop the mine on a large scale, and a smelter will probably be put in to reduce the ore.

Kern.

RANDSBURG DISTRICT.

(Special Correspondence).—The Rand mines, the Rand Mining Company owners, C. A. Burcham superintendent. — This group consists of twelve claims which are located on Olympus and Trilby hills, three-fourths of a mile south of Randsburg. The development work on the Rand group is as follows: The Rand claim has a shaft 70 feet deep, vein 9 feet wide; ore all mills $50 per ton.

The Yellow Aster claim has a tunnel in 300 feet; average width of vein, 1 foot; ore mills $150 per ton.

The Olympus lode is 30 feet wide from wall to wall and averages $15 per ton. The development work consists of a tunnel on the lode, with shaft 130 feet deep on hanging wall; shaft all in pay ore averaging $35 per ton. At the 50-foot level a drift has been run 300 feet on the hanging-wall side in ore averaging $20 per ton.

The Trilby is a small stringer 10 inches in width on which a tunnel has been run 40 feet; value of ore, $400 per ton.

The Rand group of claims was discovered in April, 1895, by C. A. Burcham, the present superintendent. The mines have paid from the surface, and every dollar expended on the property has been taken out of the mines. The ore from these mines is shipped to Garlock, the 8-stamp mill at that place being kept busy, and is not able to handle all the ore from the property. Forty men are employed at $3 per day. Cost of shipping and milling is $10 per ton.

Butte mine, A. T. McKenzie manager—This mine is located a quarter of a mile northeast of the postoffice. The ledge runs east and west and is exposed on the surface for at least 1000 feet. The ore chute extends the entire length of the claim. Considerable ore has been shipped from the surface and paid well. The development work consists of a tunnel and three shafts. The tunnel is on the east end of the claim, 100 feet deep. A winze in the tunnel is 40 feet deep. The east shaft has been sunk 100 feet. At 55 feet a level was run 115 feet west, connecting with a shaft 50 feet deep. The east level is in 90 feet, with crosscuts 10 feet. The west shaft is down 125 feet. Crosscut has been run 23 feet north to the ledge. Crosscut in ledge 7 feet and no hanging wall; all in ore that mills $50 per ton. Ore from this mine is shipped to Kane Springs, a distance of nineteen miles. Cost of shipping and milling, $10 per ton. Fifteen men are employed at $3 per day.

St. Elmo Mines, St. Elmo Mining Company, owners; D. M. Pyle, manager. — The St. Elmo group are located five and one-half miles southeast of Randsburg, and consist of five claims. The St. Elmo ore is base, and has to be shipped to smelters for treatment. One carload of ore was shipped to Denver, Col., which paid $100 per ton. There is about 300 tons on the dumps which the manager said was a good grade of ore, but would not pay to ship to the smelters. Development work consists of two shafts, each 40 feet deep. Width of ledge 2 feet, all pay ore.

The Wedge Mine, J. W. Rogers, superintendent. — This is a small claim, wedge shaped, between the Butte and the Good Hope mines. Development work consists of an incline shaft 100 feet deep; ore mills $25 per ton; ore shipped to Kane Springs mill; fifteen men employed in mine.

The Good Hope Mine, Kinyon and Sons, owners; G. B. Kinyon, superintendent.—This claim is on the Butte ledge, and lies west of the Wedge mine. The development work consists of an incline shaft 110 feet deep. At 70 feet a level has been run east 75 feet, with a winze 20 feet deep at its east end. Width of ledge 10 feet, all of which mills $100 per ton; six men are employed in the mine at $3 per day; ore is shipped to Kane Springs.

The Bully Boy mines, Bully Boy Mining Company, owners; B. M. Atkinson, superintendent.—This group is located two miles south of Randsburg and consists of seven claims. The ore has paid from the surface and most of the work has been done on the surface along the ledge. One shaft has been sunk 40 feet on the ledge. Width of ledge in shaft from 6 inches to 2 feet, all ore, milling $80 per ton, some having been shipped that paid $110 per ton.

The Yucca Tree and Winnie mines, Charles Koehn, owner.—These claims are three miles south of Randsburg and were recently bought by Mr. Koehn for $5000. On the Winnie claim there has been a shaft sunk 60 feet. Width of ledge from 18 to 26 inches. Ore taken out of shaft milled $60 per ton. The Yucca Tree claim joins the Winnie on the north, has a shaft 90 feet deep, ledge 10 to 16 inches wide. Ore taken out of shaft milled $100 per ton. Two other shafts have been sunk, each 30 feet deep, showing ledge 6 to 8 inches wide. Ore milled $150 per ton.

The Marced mine, Stephenson Brothers, owners.—This mine is located three miles south of Randsburg. At this date the mines are leased to McBride & Co., who are extracting very rich ore, which will be shipped to the Kane Springs mill. The veins are very small but very rich.

Santa Ana mines, Munson & Layton, owners.—This group of mines is located 2½ miles south of Randsburg and consists of three claims which were recently purchased by Munson & Taylor of Los Angeles for $10,000. The present owners are making preparations to prospect thoroughly. The ledges are very small but rich. A shaft will be sunk on one of the ledges.

Black Hawk Mines—This group of claims are located two miles south of Randsburg. At this date they are taking out pay ore which will soon be shipped to one of the custom mills.

Berlin Mine—A. T. Stewart, of Los Angeles, has purchased an interest in the Berlin mine and will commence development work at once.

At the St. Elmo mine the Line Mining and Milling Company, of Los Angeles, have erected a dry washer with daily capacity of 300 tons. The plant is run by a 10-H. P. gasoline engine. The company have leased 160 acres of placer ground and expect to make a profit on dirt that will pay 50 cents to the ton.

Riggs Well—This well is located about four miles northeast of Randsburg and about two miles northeast of Johannesburg, and has recently been purchased by Charles L. Morrill, G. H. Curtis and H. A Darling of Los Angeles. Curtis and Morrill are in charge of the work at the well; thirty men are employed laying a pipe line from the well to Johannesburg and Randsburg. At present the well supplies one inch of water, with water increasing very fast as they go down. It is confidently expected by the owners that ten inches of water will be developed in the near future. As soon as more water is developed a stamp mill will be built to work custom ore. The pipe line now being laid has a capacity of ten inches and will furnish water for Johannesburg and Randsburg. Johannesburg is a new town being laid out by Curtis and Morrill, and is between Randsburg and Riggs' Well. R.

Randsburg, Dec. 16, '96.

Randsburg *Miner*: The Walkover group, owned by H. B. Watson of Randsburg and A. S. Munson of Los Angeles, and located one and one-half miles from Goler, has been bonded to Ward & Co. of San Francisco for $20,000, thirty days time. The character of rock is a copper carbonate of low grade, the reduction of which will necessitate the erection of either a smelter or cyanide mill.

Mariposa.

Gazette: The Triumph Mining Company of Whitlocks that is operating the Helm group of mines under the supervision of Mr. Mackintosh, are sinking a new shaft. They have leased the Ellingham mill and are having it repaired.

The Geary mine on Whitlocks, the property of the estate of Schanz Foran, is bonded to Mr. Doolittle of San Francisco, who has been operating it. He has sunk a shaft and about a week ago got down to the vein which shows up well.

C. C. Wallace has had a force of men working on the Rolin's mine for about a year and a half. They have been driving a tunnel in to tap the vein lower down. The tunnel is in about 600 feet and will shortly be in to the vein.

Nevada.

Tidings: At the Cadmus mine the new 10-stamp mill will be ready to run in a few days.

The annual meeting of the stockholders of the Pennsylvania mine was held last week. The following were elected directors: E. H. Brown, T. Wilhelm, F. J. Thomas, J. M. Thomas, J. P. Stone, F. Zeitler. They elected E. H. Brown president, Theo. Wilhelm vice-president, F. J. Thomas secretary, Citizens' Bank treasurer, John Eddy superintendent. A stock dividend of the surplus stock was declared.

Henry Richards is taking out rich quartz from a tunnel in the Sharp & Nivens ground, near Canada Hill.

Union: A recent crushing of five tons of ore from the Belle Fountaine mine in Willow Valley district yielded $80 per ton. When the present tunnel is run 100 feet further it will tap this shoot and give 600 feet of backs.

Placer.

Colfax *Sentinel*: At the Azalea, in Blue Canyon, the contractors will have the tunnel finished before the end of the year.

The Van Avery, owned by M. T. Barnett & Company, is showing up well. The company have a 3-stamp mill on their ledge, which is over 12 feet wide, and prospects well.

The Redstone mine, owned by ex-Governor Wiley & Company, is closed down for the winter. Operations will be resumed in the spring.

Stanley & Company are running a bed-rock tunnel to tap a quartz vein in the vicinity of the Redstone mine.

Woodbury & Schell intend resuming operations on their mine in the spring.

At the Pioneer mine rapid progress is being made at the No. 4 lower tunnel. Two power drills are used, and the tunnel was advanced 317 feet during the month of November. The tunnel is now in over 1800 feet. The new machinery will be ready to run in a few days.

Superintendent E. A. Frenzel has a force of men at work at the Dorer quartz mine. The 10-stamp mill is being repaired, and will be run day and night. The ore in sight is very good.

The Dorer Brothers, the report says, have struck some very rich ore in the Central quartz mine, near the Dorer.

H. M. Freeman has sold a one-third interest in the Gold, Silver and Nickel mine, in Rattlesnake canyon, about four miles north of Cisco on the old Meadow Lake road. T. J. Smart, of Seattle, was the purchaser. The mine will be thoroughly prospected next spring.

At the Rising Sun mine a pipe line is being surveyed to convey water for power to run compressors to be used in driving the 1800-foot tunnel in from Bear river. The tunnel will tap the shaft at about 500 feet from the surface. It has been driven over 200 feet by hand work.

Plumas.

Independent: The Golden Ancient Channel Mining Company has been incorporated by Santa Clara men. The property of the company is on Bear creek, in this county.

Six men are employed in Charles Hegard's mine, on Rock creek.

The owners of the Union Grand mine, at Gibsonville, and A. Schofield, who owns a tract of mining property on the east of and adjoining the Union, have let a contract for running a tunnel from a point in the Union near where Tim Judge took out last winter a chunk of gold weighing between seven and eight pounds. The present contract is for 200 feet, but it is the design to run it across the Union ground about 700 feet, where it will be taken up by Lowell, Clough and the Schofields, and run across the ground formerly known as the Nip-and-Tuck 400 feet, and thence, if prospects are favorable, will be run on in the Michigan ground by Lowell and Clough.

San Bernardino.

(Special Correspondence).—In Kramer mining district, C. A. Peer of Colorado Springs, Col., has bonded a number of claims south of Kramer. Mr. Peer and his associates will build reduction works at Kramer in the near future. The ledges are large. Ore assays from $10 to $60 per ton. The ore is rebellious and cannot be worked by the free milling process.

Kramer, Cal., Dec. 19th, '96.

San Diego.

The Escondido *Advocate* declares that the old Escondido mines have cleared up more gold bullion at less expense during the past four months than any other mine in the State. The result of the last clean-up was twenty pounds of pure gold, besides amalgam sent away for retort.

A deed was filed in the San Diego county recorder's office last week, conveying from C. W. Ireland of Bridgeton, N. J., to the Golden Dream Mining Company of the same place, a number of groups of mines in the White Gold Basin of the old Picacho district, for $70,000. The groups transferred are: The Golden Dream group, consisting of five claims; the Alcyon group, of five claims; the Oro Blanco group, of five claims; the Noonday group, of eight claims; the Little Frank group, of four claims.

Shasta.

Free Press: The new 10-stamp quartz mill which Captain J. H. Roberts of Sacramento built at Harrison Gulch was started up last week. The pay chute has now been uncovered for a distance of 795 feet. The ledges show good width, the smallest being 22 inches.

J. W. Frank of Harrison Gulch has sold the White Oak mine near Lower Springs to T. O. Carter, of San Francisco, for $5000. Mr. Carter will soon begin the erection of a steam hoisting plant.

At the Mountain Mines (Limited) works at Keswick, the first smelting furnace was of a patent fuel-saving design. After numerous experiments the furnace was reconstructed and is now in perfect working order. The slag from the furnace is run off into a stream of cold water, which crystallizes the molten rock and forms a fine black sand, which is carried down the stream. The matte is run into slag pots and then wheeled to the moulds, where it is formed into plates. After cooling, these plates are broken up with hammers and the matte placed in sacks, which are loaded upon the cars and shipped to the company's refinery in New Jersey. The capacity of the furnace now in operation is 380 tons per day. The capacity of the one in course of construction is the same. The company's ore is estimated to yield 14 per cent copper, with a small percentage of both gold and silver. The matte assays from 60 to 70 per cent pure copper, and the output of the smelter now averages thirty tons per day. In the experimental stages of the smelting plant it was found that the sulphur with which the ore is heavily impregnated formed into huge clinkers, which choked the furnace. By roasting the ore the sulphur is eradicated. When completed the roasting plant will consist of 500 roasters. The ore is formed into large kilns with pine wood scattered about through them. The wood is ignited and the sulphur consumes itself in from forty to sixty days. The company has already expended over $1,500,000, and will increase the capacity of its smelting plant by the erection of new furnaces until the number reaches five. There are now over 300 men employed at the smelting and roasting plants and 100 at the mine. At the mine the ore is loaded directly into the cars, ten of which constitute a train, and are drawn by one locomotive. The cars have a capacity of ten tons each. Two engines are now in use and a third has been ordered.

Sierra.

Union: The New Sierra Buttes mine at Sierra City, which is being operated by W. H. Martin and others, is reported to be looking well. There is an immense body of ore in sight, and the mill is kept running night and day. A few days ago the miners struck another big ledge in the hanging wall, which shows well in mineral. The company will probably add several more stamps to the mill in the spring, as there is enough ore in sight to keep a 50-stamp mill running steadily.

Mountain Messenger: I. Copeland, near the Northern Belle mine at Loganville, is erecting a 5-stamp mill for prospecting.

At the Prospect mine, in Slug Canyon, the front ledge was cut some time ago, and the men have since been driving the tunnel ahead to reach the back ledge.

Outside work at the York mine is nearly completed for the winter. Development work in the mine is being pushed ahead.

Siskiyou.

News: F. D. Fraser is about to interest New York capital in his Golden Eagle, Siskiyou and Black Crow mines on Indian creek. The first thing done will probably be the erection of a stamp mill and the tunnels extended to tap the Black Crow vein at a depth of 300 feet below the surface. This ore mills about $60 per ton.

Harbaugh & Walker have located an 18-inch ledge on the Quartz valley side of the mountain.

Journal: The Klamath River Dredger Company is working at Oak Bar, having found a good paying bed of gravel. They will keep at work all winter. There are many rich places on the Klamath that the dredger can work which have never been mined at all. Since this dredger started up last summer they have worked on paying ground most of the time.

Reporter: Moxley & Fitzsimmons are sinking a shaft on the Cosmopolitan mine in Quartz valley, and the ledge is widening in depth.

At Sawyers Bar the Oregonian property, which has been lying idle for over a year, is again in operation under the management of Pierpont, Eldridge & Malloy.

Trinity.

Journal: On East Fork the North Star mill is running steadily with a small force in the mine. The ledge is from 3 to 7 feet thick.

Nicholson and Kleckner, who have a lease on the Poor Man mine, had twenty-eight tons of their ore milled in the Enterprise mill last week, which turned out over nineteen ounces of gold or nearly twelve dollars a ton.

At Deadwood a new mine is being opened up at the foot of Donnelly Gulch.

The Sibyl mine is making extensive improvements.

W. S. Lowden proposes that a company be formed to sink a shaft to prospect for the channel of the old bed of the river which formerly ran through Weaverville. It is a well-known fact that the bedrock of the basin wherever reached is what is known as false bedrock. By sinking a shaft to the proper depth there is no question but that it would tap the ancient channels and open up a vast amount of auriferous gravel for dirt working. The question could be thoroughly tested at a cost of from $2500 to $5000. These ancient channels are worked in other counties of the State successfully.

Tuolumne.

The Fitzgerald brothers of Sonora have sold the Golden Era mine for $80,000 cash. This mine adjoins the Jumper mine, and both will henceforth be worked by the same company.

The managers have decided to put in a hoisting engine right away at the Whisky Hill mine, so that the shaft may be sunk with more speed.

Independent: The Sunset mine on the South Fork of the Stanislaus river, owned by Frank Vassallo and Abe Sartori, has a 2½ foot ledge which shows free gold. The rock is estimated at from $30 to $50 per ton. The mine has been bonded for $20,000 and with Joe Rolleri as

superintendent, a tunnel will be run in on the vein from the river, giving several hundred feet backs.

Capt. Edwards and Wm. Butis are opening up a prospect west of Nigger Hill.

Considerable prospecting is being done at the Peking Consolidated mine, near Parrot's Ferry. Several other mines in that neighborhood have been started up.

Near Robinson's Ferry on the South Carolina a tunnel has been run to a depth of 1200 feet, and crosscutting is being done.

Operations will be resumed on the Lady Washington shortly. Superintendent Fisher has been devoting his attention to opening up the Modoc, near the Buchanan, with very flattering results.

It is stated that the Norwegian mine on Jackass Hill on the east lode has been sold for $25,000 cash. J. Lawson and two sons were the owners of the property. The purchaser is R. B. Murdoch, of the Bank of Commerce, who buys for European capitalsts.

NEVADA.

Silver State: Strong & Graves have begun work upon the Blackbird tunnel, driving it until the ledge is tapped, when the mill will be started.

De La Mar *Lode*: Good reports continue to come from the Magnolia mine and preparations are being made to ship ore to the market.

Elko *Tidings*: A new hoisting works has been erected by the Dexter Company and a new mill completed.

Pioche *Record*: Interest yet centers in the old El Dorado Mining district in the extreme southern part of this county. At the Marie Camp, five miles below El Dorado canyon, the San Francisco company will soon be ready to start up its new mill. W. C. Wallace, who was in the district last year, was recently in London to place some properties. Several conveyances from him to English parties were filed in the County Recorder's office here last week for record.

Lyon County *Times*: The Succor mine, in Silver City, formerly owned by S. Longabaugh of Empire, has been sold to James, Taylor & Deitrich for $10,000.

Reno *Gazette*: Work will shortly be commenced on the Big Indian mine, in Esmeralda county.

Austin *Reveille*: The Ione Gold Mining Company's team has arrived in Austin with over three tons of concentrates which will be shipped to a smelter for reduction as soon as a carload lot can be made up.

White Pine *News*: A 4-foot ledge of gold ore is reported uncovered in the Ely mine.

A good showing is reported on the Los Angeles, some rich washes in gold having been taken from there recently.

Another rich strike in copper has been made at West Camp in the Star of the West. The ledge is over 8 feet wide and can be traced for a considerable distance.

The Ben Hur Mining Company of Granite district are negotiating for a 10-stamp battery to erect on the stream of water at Campbell's ranch, convenient to their mines, and expect soon to be in active operation.

OREGON.

Baker City *Democrat*: Mill building at the Columbia and Ohio mines in Cracker Creek district is being pushed as rapidly as the weather will permit. The Columbia plant is expected to be in operation this week.

The Ten Strike mine at Bourne has been sold to the Longmaids by Thomas McEwen.

The Con. Virginia shaft is now down 250 feet and deep sinking will continue until a depth of 500 or 600 feet has been reached.

The 600-foot working shaft at the Virtue is being sunk 100 feet deeper.

Grant's Pass *Observer*: About 19,000 pounds of machinery for black sand mining arrived at Coquille City lately. It is owned by foreign capital, who have had representatives there for some time past.

Jacksonville *Times*: Several giants are being operated at the Alexander & Bent mine on Galice creek, formerly owned by Ennis & Cameron.

S. Mulveyhill and Chas. Anderson of Gold Hill district recently found a valuable deposit of mineral on Water gulch. The formation is a stratum of porphyry and iron.

Southern Oregon's gold output this year promises to exceed that of any previous one for a long time, judging from the preparations for the opening of new mining propositions and the increased activity at mines which have been operated before.

Medford *Miner*: The Black Gold Channel mine has started up again with a force of thirty men, under the management of Mr. Pierce of Oakland.

Rogue River *Courier*: Baylord & Iliff have been delayed in getting their 5-foot pump from the East. They have put in a 30-inch flume to carry off the debris into Rogue river, and when the pump is at its highest capacity it will turn 1500 inches of water against the gold-bearing banks at what will equal a 250-foot pressure.

Younglove and Green have begun piping on Louse creek. They have a 900-foot tunnel flumed and will pipe night and day.

BAKER COUNTY.

The Ibex mine, Sumpter district, has been bonded to William White, representing the Hearst estate. The bond price is reported to be $65,000.

BRITISH COLUMBIA.

Mining Journal: Ice in the Fraser and Quesnelle rivers has stopped all dredging operations for this season. The dredgers in the vicinity of Quesnelle have had considerable trouble with their machinery. What little work was done goes to show that if they can be made to work successfully a fortune is made for the shareholders.

The Golden Cache mine near Lillooet has a ledge traceable for 2500 to 3000 feet, showing a width of from 12 to 24 feet, and underlying a slate formation and carrying gold. The property was purchased last spring for $25,000 by Vancouver people. Shares are now selling at a rate of $1,000,000 for the whole property.

Rossland *Miner*: The contract for the construction of twenty miles of the Columbia and Western road from Trail up the Columbia river has been awarded to a Butte, Montana, firm and work will be started immediately.

At Nelson the Hall mine is producing 120 to 150 tons per day. There are about 225 men working at the mine, but owing to development work the output is not as heavy as it otherwise would be.

In the Deer Park the crosscut shows 20 feet of good ore. A wagon road will be cut out at once from the mine to the Red Mountain Railroad.

The new smelter in connection with the War Eagle will be built at Northport and will have a capacity of 250 tons daily. The plant will be constructed so as to treat both silver-lead and gold copper ores. The freight rate on ore from Rossland to the smelter will be 75 cents per ton and the treatment rate $6.25, or a total of $7. This will enable $10 ore to be mined at a profit whenever it is found in large bodies. A very conservative estimate of the amount of ore averaging over $10 and less than $20 per ton now in sight in Rossland mines places the figures at considerably over 500,000 tons.

UTAH.

Salt Lake *Tribune*: Returns from samples of the Four Aces show that upon the 400-foot level the ore contains 60 per cent lead and 99.6 ounces silver, while in a parallel chute at a depth of 350 feet assays showed 63 per cent lead and 91 ounces silver. On the 400-foot level there is exposed nearly a foot of galena, that is widening out as developments progress.

The Florence Lode Mining Company has been incorporated with a capital of $150,000, to operate the Silver Bar mining claim in Juab county.

Mercur *Mercury*: West Dip continues to be the center of attraction and people are flocking there in large numbers.

The Sacramento Company is working fifty men and milling 100 tons daily.

The Mercur Gold Production Company, whose property lies north of the La Cigale, have encountered the vein, but the values are low.

The old Park mine which was purchased by Riter and Loose will be incorporated, and development commenced.

Work has been resumed at the Sunshine. Men are sinking the incline and running in the 700 and 800 foot levels. The incline will be run down 1000 feet in search of richer ore and it is possible that the mill will not be resumed until a better body of ore is found.

Tintic *Miner*: The Homestake shaft has attained a depth of 250 feet and is going down on ore that is improving. At a depth of 300 feet they will cut out a station and begin drifting to tap the ore body that was uncovered by the former owners of the property, who abandoned work, as was the rule at Silver City when the pyrites were encountered.

The South Swansea has made another rich ore strike on the 400 level. The ore is the highest grade ever taken out of the mine.

On the Sunbeam at 300 feet, the last thirty of which has been through a very promising iron pyrites, they cut into a 20-inch vein of copper pyrites which has carried good values in silver and gold, where encountered above.

An option has been given on the Humbug mine at $300,000.

Eureka *Democrat*: At the North Star a whim is being used, but when the 300-foot level is reached a hoisting plant capable of reaching the 1000 level will be put in. A mill is contemplated and arrangements are being made to begin its erection.

IDAHO.

Spokane *Chronicle*: The Tip Top Gold Mining Company has been organized to operate the Tip Top mine in the Florence district. The ledge is over 8 feet wide, carrying 40 ounces of silver and $20 in gold.

The recent strike in the Yellow Jacket mine surpasses all discoveries yet made. The ore body is 40 feet wide and runs $12 per ton.

MONTANA.

Col. Thos. Ewing, manager of the Diamond Hill Gold Mines, Ltd., reports that the dam for the electrical plant is more than half completed. The big ditch for carrying the water to the power plant is finished, and so is the bed of the flume of 6000 feet. At the mine, the working tunnel, 7x8 feet in the clear, has been driven more than 200 feet within thirty days. The site for the new 120-stamp mill is being graded. He expects the machinery to begin arriving from San Francisco about January 1st.

Butte *Miner*: The new engine at the Original mine has been started. The mine will be pumped dry in a few days, when the work of sinking the shaft 200 feet deeper will be commenced. It is expected that ore will be shipped from the Original by January 1st.

The Butte & Boston Co.'s property will be sold February 1st. As soon as the sale is confirmed by the court a Montana board of directors will be formed and the management decided upon. The money realized from the sale of the property will be used to pay off the unsecured debts against the company first.

Inter-Mountain: A conservative estimate of the mineral output of Butte for the year is as follows:

	Pounds Copper.
Anaconda	130,000,000
Boston & Montana	45,000,000
Montana Ore Purchasing Company	18,000,000
Parrot	14,000,000
Colorado	5,000,000
Clark's Reduction Works	4,000,000
	216,000,000

At an average price of 11 cents per pound, Butte's copper product alone will reach $23,760,000, with one of its principal producers (the Butte & Boston) shut down during the year. It is estimated that the gold and silver, bi-products of the copper ores, will yield $8,000,000, so that the total output of the district will reach $31,760,000.

The total value of the copper, silver and gold product of Butte since the year 1880 and conservatively estimating the output of the present year based on the returns for the last ten months is as follows:

1880	$ 1,000,000
1881	1,247,500
1882	2,100,000
1883	1,950,000
1884	6,720,000
1885	11,159,000
1886	13,246,500
1887	16,113,500
1888	19,500,000
1889	22,859,000
1890	23,000,000
1891	23,465,000
1892	26,500,000
1893	24,819,000
1894	27,189,000
1895	30,080,000
1896	31,760,000
Total	$289,338,500

Butte will this year produce 65 per cent of the total copper product of the United States.

SOUTH DAKOTA.

The annual report of State Mine Inspector Jeffrey for the year ending Dec. 1, 1896, has been filed. He says in part: "The unusual activity in mining seen during the year 1895 has been maintained throughout the year 1896. I have reported 1927 miners employed for 1896, which does not include men engaged at the mills, smelters and other reduction works, and such other vocations above ground as are directly connected with mining operations. This is in excess of the year 1895 by 224 men. The increase of the gold product for 1896 over that of 1895 is $1,268,675, and the outlook for the year to come is more promising than ever.

"The siliceous ore bodies have been largely developed. In fact, the work in this line is described as phenomenal, and made more certain and profitable by the fact that the old 'hit and miss' methods of prospecting and developing these bodies have given way to more intelligent and scientific search, aided by a far better understanding of the formation in which paying ore is to be found. The possibilities of the siliceous ores alone promise a future for the Black Hills, of which a conservative survey might easily be declared fabulous. The find in the Bald Mountain, Ruby Basin and Spearfish districts give promise of greatly increased gold output for the future. The ores of all these districts are easy of access, the districts being laced with a network of railroads, reaching to all mines of any importance, while no complicated machinery is required in their operation, the pick and shovel and hand drills being effective in prosecuting economical work.

"Reduction works of all classes are increasing their plants and getting in shape to handle a larger output of ore than in any past year.

"Transfers have been made of the

Lew Wallace, for	$ 18,000
Axiom group	20,000
Bottleson and Plutus	180,000
Florence	90,000
Galena property	400,000

"Bonds have been issued for

Sitting Bull and Richmond, unknown.	
Deadbroke (six months)	$85,000
Snowstorm (six months)	75,000
Montezuma	50,000

"The following table shows the amount of ore milled by smelters and reduction works, and the value of the output of each for 1896:

	Tons Milled.	Value.
Homestake	390,000	$1,552,000
Highland	182,000	737,000
Deadwood-Terra	204,000	400,000
Apex Con. Co.	8,000	24,000
J. R.	1,600	15,000
Keystone	18,600	85,000
Holy Terror	10,000	72,000
Deadbroke	7,500	50,000
St. Elmo	800	10,000
Grizzly Bear	1,350	12,000
Hawkeye	6,300	22,000
Columbus	1,000	5,000
D. and D. Smelter	75,000	1,150,000
Galena Smelter	4,300	55,000
Golden Reward (ten months)	37,887	611,134
B. H. G. and S. Ex. Co.	16,800	252,621
Kildonan	38,000	700,000
Ores ship'd from Black Hills	4,300	258 000
Placers, estimated	.....	18,000
Total for 1896	1,007,387	$6,178,675
Total for 1895	833,890	4,910,000
Increase	173,587	$1,268,576

"Added to this output of the D. and D. smelter there is an annual output of $200,000 in copper from ores shipped in for treatment.

"The increase of men over last year is largely in the free-milling districts of the southern hills and the Galena district. The demand for men from the free-milling district would indicate that greater attention is being attracted to these parts and that capital is looking that way. The prospect for that district grows brighter each year, as deeper sinking shows good prospects.

"Since the above report was compiled, discoveries of high-grade siliceous ores have been made in the limestone formation in and around Ragged Top mountain, which bid fair to rival both in value and amount any yet made in the Rocky mountain region."

COLORADO.

(Special Correspondence).—The most striking developments and the richest finds recently uncovered in the Victor district have been on Beacon hill. The most phenomenal of all is that of Blunt Bros., lessees on the Fannie B. According to the purchase of ore made by a local sampler, the first grade ran in gold 998 ounces to the ton; the second, 170 ounces.

The Vindicator, owned by the Vindicator Consolidated Gold Mining Company, on Bull hill, opened up in May, 1895, now makes a definite showing. The main working shaft is down 300 feet. There are four levels, the second being 120 feet from the surface, and runs 300 feet, showing a chute of ore the full length of the drift. The vein is about 4 feet wide and the ore, which is oxidized, runs about $22 per ton, with some higher grade in the pay streak. On the 200-foot level the ore chute is about 8 feet wide. At the latter depth a parallel vein was struck and has been opened for 175 feet, showing 12 feet in width, ore chute 75 feet in length, running in gold about $47 per ton. At the fourth level the same vein was cut 253 feet from the surface and is opened up for 120 feet and stoped to the third level, showing good values and increasing width of ore chute.

The Ashmont, on Raven hill, west of the Elkton, has a shaft down 125 feet and has struck ore on the 65-foot level. Shipments thus far have run $24 to $130 per ton.

The Legal Tender, now known as the Golden Circle, on Bull hill, output 1000 tons of ore for November, and the December product will be about the same. Shipments were from the various levels in the 300-foot shaft.

The Theresa, on the south slope of Bull hill, shipped 220 tons in twenty days in November from the drifts and stopes from the 200-foot shaft. For the first fifteen days in December the shipments were 200 tons of medium grade.

The Providence is located within the town of Victor. Its shaft is down 170 feet. At the 100-foot level is a drift 135 feet north and one 65 feet south. They are supposed to be on the same vein that has made the Gold Coin property of great value.

The Gold Coin was discovered while grading the streets of the town of Victor. The vein was followed under the Victor Hotel and on toward the saddle between Battle and Squaw mountains. A surface excavation 100 feet long uncovered ore all the way, and they are now understoping back to the point of beginning. A large ore house is being built and a steam hoist is in operation at each shaft.

The Coriolanus and Hallett & Hamburg, between Battle and Squaw mountains, show some progress. The former is leased to Coleman, Jamison & Co.

The Golconda, at the foot of Straub mountain, has a good plant of machinery and is sinking with the expectation of striking the May Bell vein, whose workings in the May Bell tunnel show positive values. The vein trends toward the well-known mines on Battle mountain.

The Anchoria-Leland, over on Gold hill, one of the best-known producers of the district, having the modest stock issue of 600,000 shares of the par value of $1 per share, constitutes a close corporation. Its workings consist of a three-compartment shaft, 700 feet deep, and about 1000 feet of drifts and levels. Two sets of compressed air drills are operated. One shipment of high-grade ore is made a month to the smelters, which runs about 250 ounces gold to the ton. The second grade ore is milled by cyanide and chlorination and yields about 1¼ ounces in gold to the ton. It is the intention to sink the shaft to a depth of 1500 feet.

WASCOTT.

Victor, Col., Dec. 19, '96.

ARIZONA.

F. Powers is erecting a 10-stamp mill to reduce the ores of his World's Fair mine, near Harshaw.

Finnegan, Jones and St. Charles of Kingman have taken a lease and bond on the Lucky Boy group of mines. Recent assays show a value of 1150 ounces silver, and $70 gold per ton.

The Connor and Minnesota mines are both showing up well in silver and gold ore. Fourteen men are now employed, but the 10-stamp mill is not operated all the time on account of an insufficient water supply.

The new hoist placed on the Treasurer mine at White Hills will be used in sinking the shaft to a depth of 1000 feet.

The 10-stamp mill of the Cedar Valley Mining Company in Mojave county is running day and night.

Iowa and Chicago parties have recently purchased a group of mines near Cherry Creek. A 5-stamp mill will be erected. There is a 3-foot vein of ore running from $20 to $150 a ton gold.

Globe *Silver Belt*: At the Old Dominion, owing to the breaking of one of the blower shafts at the smelter, only the 100-ton furnace is in blast.

The hoist is in place on the Black Copper, and the sinking of the shaft, to a depth of several hundred feet, will be resumed at once.

An English syndicate has become interested with N. L. Amster in the bond of the Continental group, west of Globe. The first work contemplated is to drive a cross-cut tunnel 500 feet, and continue the present shaft down 150 feet to connect.

NEW MEXICO.

Silver City *Enterprise*: At Pinos Altos the Treasure Mining Company has fifty men employed in the mine and mill. Twenty tons of ore is crushed per day, about 60 per cent of the gold being saved upon the plates and the balance is recovered in the concentrates of which about five tons are saved daily.

Manuel Taylor has nine men employed on the Providencia mine.

Herbert Dawson is working twenty men on the Santa Rita company's mines which he has leased.

The Elnora mill is about completed.

At Mogollon the Confidence mine is producing about fifty tons of ore per day and twenty stamps of the company's mill is kept at work.

LOWER CALIFORNIA.

Lacy brothers have purchased the Bareno Bros. mines at San Francisquito, on the gulf coast of Lower California. They intend to open up the mines on a large scale.

A schooner is to load at San Francisco with machinery and supplies for P. Allsopp, who has purchased an interest in the Salorio mines at San Francisquito. Allsopp is said to be preparing to invest a large sum in the mines.

Practical Information.

Pneumatic Power in Workshops.

In ordinary compact factories with fairly efficient steam plant, the gross cost of the motive power, that is, of fuel, oil and water, is but one per cent of the total paid out in workmen's wages.

In ironworking, pneumatic power often increases a man's output of work 200 per cent. Then, if supplying one man with his proportion of the motive power were by the use of air to increase his proportion of the motive power cost by 50 per cent, it is evident we should then have a similar 50 per cent margin for profit. As the actual cost is nearer 5 per cent there is evidently a wide margin for extra outlay in machines or in their repair, which expenditure, per day or per man, is increased in the attempt to use pneumatic power, but in the cost of such tools as drills, rhymers, taps, boring cutters, etc., is not increased per foot run of actual work done, when compared with manual labor.

Thus it is clear that if the additional machinery a factory makes or purchases in trying to use air as a distributor of power is confined to such tools as will be often or fairly continuously used, this outlay is justified, and the cost of compressing relatively to total wages is so small that tools evidently wasteful in the use of air are economical, or rather show a net balance to the good, if the men find them portable, easily adjustable and handy to use, and their simplicity of make and freedom from repairs and breakdowns, results in but few delays to the steady output of work.—J. D. Barnett.

An important feature in the mechanical world is predicted by a writer in *Engineering* for the material known as [illegible] iron, now being introduced. Its tensile strength is represented to be sixty-three thousand pounds and more to the square inch, and, after being heated to a dull red and plunged into cold water, it can be easily filed, showing that it takes no temper. Specimens are shown which have had portions heated and drawn out under the hammer after being twisted cold, without fracture, and a notable piece of work of the new metal is mentioned, viz., a heavy chain, of which the links were cast open, then joined and welded without the use of flux; also valve stems, crankshafts and other similar pieces, finished to pattern in a lathe and exhibiting surfaces without a blowhole, intricate castings, too, being reproduced regularly without failure, while a very high percentage of losses has attended other methods of producing very strong castings. The main question, however, is that of cost, for there are foundries that produce castings which will stand all the above tests, but without being really cheap, as is claimed for this new method.

Among the patents recently granted is an arrangement for giving automatic signals to a locomotive by means of a lever placed so as to be actuated as the engine passes over certain parts of the track. Arranged along the track is a third rail, which may be a continuous rail or a series of broken rails, these rails having beveled ends, and being so placed that, in passage of a locomotive, a wheel supported from a bracket will ride upon the third rail, the depression of the lever causing the whistle to be sounded, add the rotation of the wheel sliding a rod in a sleeve and swinging the other lever to ring the bell. The third rails are placed along the track near crossings, and at other places where it is desired to give warning, a continuous rail causing a continuous blast of the whistle, and a series of broken rails producing intermittent blasts.

A company of English glass workers are making the claim that ordinary plate glass will make a more durable monument than the hardest marble or granite known to stonemasons. Glass is practically indestructible. Wind, rain, heat and cold have their effect on the hardest rock; solid granite eventually crumbles away, and one can seldom read the inscription on a stone gravestone fifty years old. A glass stone will look as fresh a couple of centuries after its manufacture as on the day it was erected, and the inscription can be made ineffaceable. The thick plate glass used to glaze the portholes of steamers can resist the stormiest sea, and is practically unbreakable.

A new floor-making material called "papyrolith," has been invented by Otto Kraner, of Chemnitz, Germany. The article is a special preparation of paper pulp in the form of a dry powder. This, when mixed with water, may be spread like mortar over stone, cement or wood, where it dries quickly and may be smoothly planed; besides which, it may be tinted almost any color, so as to adapt it for parqueting with variegated borders, or for panels and mosaics. Among the advantages claimed by the inventor are freedom from crevices, non-conductivity of heat, elasticity, and remarkable durability.

An iron ship weighs 27 per cent. less than a wooden one, and will carry 115 tons of cargo for every 100 tons carried by a wooden ship of the same dimensions, and both loaded to the same draught of water.

Gold in Nevada.

On his return East from an examination of the mineral district of eastern California, east of the Sierras, and of western Nevada, by Director Walcott of the United States Geological Survey, the Boston *Transcript* had the following to say: "He made a careful study of the gold deposits of Silver Peak district of Nevada and also visited several points of interest along the Inyo range of eastern California.

"He considers the group of quartz mines on the ridge northwest of the town of Silver Peak, Nevada, as embracing one of the most promising gold districts of the West. The mines of this group extend along the line of outcrop for between three and four miles. They have never been opened up systematically, and very little work other than prospecting has been done upon them during the last thirty years, the rich silver mines situated some six miles to the south having monopolized the attention of those interested in mining development in the district. There is no need, however, of extensive mining operations to show the extent and value of the gold-bearing quartz; it lies on and near the surface along the eastern slope of the range, and is cut through by six main canyons. These canyons reveal the fact that a quartzite of Lower Cambrian age is penetrated on the line of its bedding by a large number of quartz veins, all of which are auriferous. Some of these are fully 6 feet in thickness, large portions of the mass averaging $10 to $12 per ton. Large pockets occur which are much richer. If this single group of mines were worked by modern methods they should together produce at least $1,000,000 a year, and possibly much more.

"There are other promising gold deposits which are located west of Sodaville, in Esmeralda county, Nevada, and there is still much gold left in Gold Mountain district, about fifty miles southeast of Silver Peak.

"Mr. Walcott's purpose in visiting this region was to determine whether it was desirable to enter upon the topographic mapping and geological survey thereof. He thinks that the work should be taken up at once and is of the opinion that, with better transportation facilities, there will be further discoveries of gold, and that mines already known, but now idle, will be worked. There is, moreover, a bituminous coal field twenty-five miles north of Silver Peak which promises to be of economic interest, as well as copper deposits west of Saline Valley. Under existing conditions the extensive silver deposits cannot be worked with profit."

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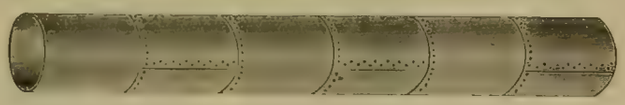

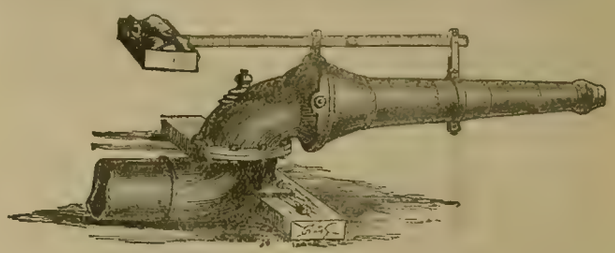

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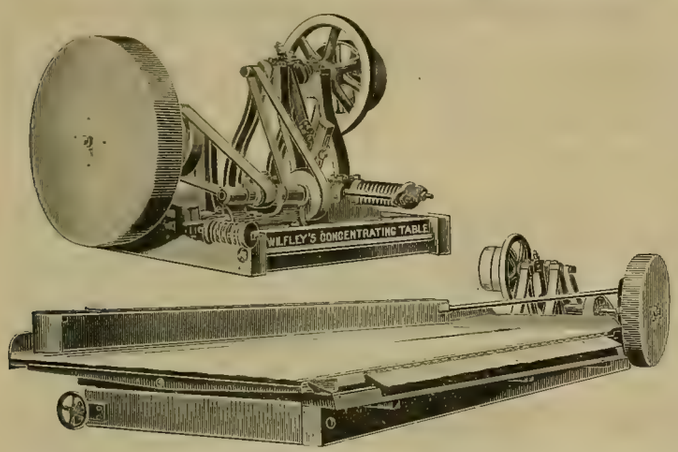

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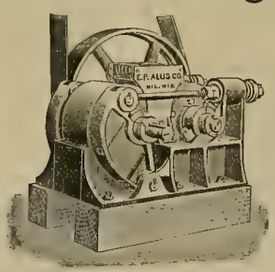

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Coast Industrial Notes.

—It is proposed to start a new bank in Carson, Nevada.

—The Albany, Or., woolen mills will shortly resume operations.

—Nearly 40,000 head of cattle from the Harney country have been shipped from Ontario, Or., this season.

—About 3000 head of beef were fed at Reno, Nevada, this winter, sold for 6 cents on condition that sellers keep the cattle until Christmas.

—The Mariposa Electric Company, Mariposa, Cal., capital stock, $1,000,000, is credited with intention to erect a plant to cost $300,000 on the Merced river.

—Fire losses on the Pacific coast for the past three years show a gradual reduction. In 1894 the figures were $4,993,425; for '95 $4,143,161; '96 $3,655,810.

—The Terminal Railroad Company of Los Angeles have determined to substitute electricity for steam as a motive power between Los Angeles and Verdugo Park.

—At an auction sale of horses of the Northern Pacific Railway Company at Tacoma, Wash., last week 1100-pound matched teams sold for $4.50 a team and 1000-pound horses broken to ride or drive $2.50 a head.

—One firm of rasin packers in Hanford, Cal., has disbursed $50,000 in the past month for raisins. There are eight packing houses in Kings county and collectively these houses have disbursed nearly $500,000 within a month.

—About 100,000,000 feet of fir is now afloat in Puget sound. The Port Blakeley Mill Company has nearly one-quarter of the whole amount, the Puget Sound Mill Company about one-fifth and the Tacoma Mill Company nearly one-sixth.

—It is stated that the Pacific Coast Railroad running from San Luis Obispo, Cal., to Los Olivos is to be extended to Santa Ynez. J. S. Bace, vice-president of the company which controls the line, says that work will be begun at once and pushed to completion.

—It is proposed to build a boulevard from Tacoma, Wash., to University Place, on the Narrows; then around Gravelly and American lakes, and with sub-driveways through all the National Park region extending thirty miles toward Portland. Rights of way outside the city limits have been secured.

Recently Declared Mining Dividends.

Le Roi, British Columbia, $25,000, payable Dec. 4th. Total in thirteen months $250,000.

Bullion-Beck, Utah, $45,000, Dec 31; a total to that date of $1,947,000.

Hope Mining Co., Hope, Montana, $10,000; a total to date of $612,252.

Last Chance mine, $20,000 on Nov. 20.

Fortuna M. and M. Co., 10c per share, payable to-day.

Recent California Mining Incorporations.

Sunny South Mining and Development Company, Sonora: J. F. Summers, T. W. Wells, D. Cozzens, J. H. Shine, J. B. Curtin, Sonora, Cal.; capital stock, $300,000; subscribed, $25.

Anaconda Gold Mining Company, San Francisco: T. W. Ames, T. H. Ward, J. W. Ebert, C. W. Waitt, W. M. Ward, San Francisco; capital stock, $1,000,000; subscribed, $100.

Lakeview M. and M. Co., San Francisco: C. W. and A. C. Griffin, Alameda, R. R. MacLeod, T. E. Johnson, San Jose, L. E. Prusso, San Francisco; capital stock, $100,000; subscribed, $1000.

La Parisima G. M. Co., San Francisco: J. M. Linehan, E. Pohli, San Francisco, J. S. Butler, J. Hutchinson, Palo Alto, J. L. Given, Oakland; capital stock, $3,000,000; subscribed, $250.

Personal.

D. F. VERDENAL, who was for many years a well-known mining secretary in this city, and who is now making his home in New York, is in San Francisco on a visit.

THE following officers have been elected by the Alameda County Miners' Association: President, Professor S. B. Christy, of the mining department of the University of California; vice president, F. Chappellet; secretary, Thomas W. Jeffress; executive committee, E. H. Benjamin, Charles G. Yale, W. R. Thomas and J. S. White.

THE following have been named by the nominating committee of the California Academy of Sciences as candidates to be presented at the annual election, January 4th, 1897: Dr. David Starr Jordan, president; William E. Ritter, first vice-president; Dr. H. H. Behr, second vice-president; J. O'B. Gunn, corresponding secretary; G. P. Rixford, recording secretary; Charles R. Keeler, librarian; Charles F. Crocker, W. S. Keyes, E. J. Molera, George C. Perkins, W. S. Chapman, Granville W. Stewart, trustees.

Commercial Paragraphs.

SHOWERS & DOWNING have purchased from the Prospective Mining and Machinery Co., 127 First st., S. F., another Tremain Steam Stamp, to place by the side of the one bought last July, which is now crushing custom ore at Garlock, Cal.

THE new chlorination works of the Colorado-Philadelphia Reduction Company, at Colorado City, Colorado, is practically complete, and has been operating since Nov. 1st. The buildings, five in number, are very substantially built and the entire plant impresses the writer as one of the largest and one of the best equipped of its kind in the country. The first building contains the machinery and apartments for crushing and sampling, with an 80 horse-power engine which operates separately and apart from the other buildings. The second building contains the bedding floor and dryer, while in a separate compartment of the same structure are the five finishing rolls and the three Ropp furnaces. Under the third roof are ten chlorination barrels, the settling tanks and the precipitation room. Crude oil, piped from Florence, serves as fuel for the furnaces. A 268-horse power engine drives the machinery in the rollroom, dryer, furnaces, barrel room and elsewhere. As yet only Cripple Creek ores are being treated, and of those only the medium grade, which run from $20 to $40 per ton. The small per cent of sulphur contained in these ores practically disappears under the roasting process.

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MANAGER, - - - - - HORATIO BEVERIDGE, (Formerly with H. M. Newhall & Co.)
SECRETARY, - - - - - J. S. ANDERSON, (F. S. A. of Scotland.)
MINING EXPERT, - - - - - WILLIAM JOHNS.

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THIS COMPANY has been formed under the general laws of the State of California; to have its principal place of business at the City and County of San Francisco: to have a Capital Stock of Two Hundred and Fifty Thousand ($250,000) Dollars, divided into Fifty Thousand (50,000) Shares of the par value of Five ($5) Dollars each; its Board of Directors to consist of Five (5) persons, the gentlemen whose names are given herein being stated in the Articles of Incorporation as those appointed for the first year.

The purposes of the Company, as expressed in its Articles of Incorporation, are the following:

To act as agents for owners, sellers or purchasers of mining property upon the Pacific Coast in connection with the management, sale or purchase of such property; to make examination, inspection and exploration of mining property, and render reports thereon; to procure the examination of the title to mining property and to furnish a certificate thereof; to acquire by purchase or otherwise, hold, work, sell and convey and otherwise deal in mines, mining and other property either on its own behalf or as trustee or agent for others; to acquire and hold, buy, sell and dispose of shares of stock in other corporations; to act as agent or commission merchant in procuring and furnishing machinery, stores and general supplies required in the business of mining; to act as financial agent in connection with the purchase, sale, development or working of mining property, or the lending of money on security thereof; to do such other acts and conduct such other business as may be found to be to the interests of the corporation and in furtherance of the corporate purposes hereinbefore expressed.

It will be the policy of the Company to attain and preserve the highest possible reputation and standing as well for integrity of business character as for efficiency and reliability of the experts and other agents employed by it. The great importance and influence of such an institution will be manifest to all persons who have been connected with the mining industries of this Coast.

We, the undersigned, having read the foregoing Prospectus, approve the purposes therein set forth. We believe that a responsible and trustworthy company such as is proposed would supply a want long felt in this community.

J. H. NEFF, President California Miners' Association.
WM. JOHNS, Manager Sierra Buttes Gold Mining Co.
H. G. BLASDEL, Ex-Governor State of Nevada.
H. PICHOIR.

THE HARRINGTON & KING PERFORATING CO. CHICAGO.

METALS PERFORATED AS REQUIRED FOR

MINING SCREENS OF ALL KINDS

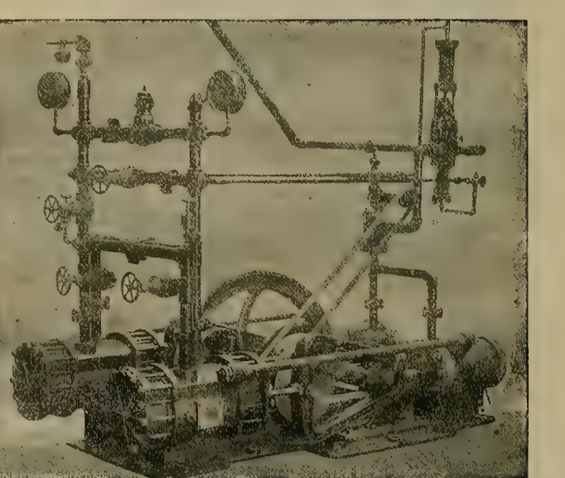
AND FOR USE IN

Milling and Mining Machinery
Reduction and Concentrating Works
Woolen, Cotton, Paper and Pulp Mills
Rice, Flour and Cottonseed Oil Mills
Sugar and Malt Houses
Distilleries, Filter Presses
Stone, Coal and Ore Screens
Stamp Battery Screens
Brick and Tile Works, Filters
Spark Arresters, Gas and Water Works
Oil, Gas and Vapor Stoves
Coffee Machinery, etc., etc.

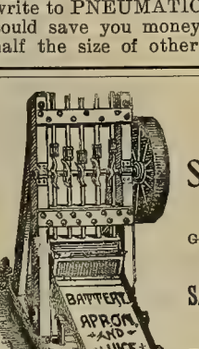
Standard Sizes Perforated Tin and Brass Always in Stock.

Main Office and Works: 209 to 211 North Union Street, Chicago, Ill., U.S.A.
Eastern Office: No. 284 Pearl Street, New York

DOUBLE PIPE AIR COMPRESSOR.



This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to PNEUMATIC POWER CO., at 306 Pine St., San Francisco, Cal. We could save you money, though, in cost of foundations, as our Compressors are half the size of other makes.



To Gold Miners!

Silver Plated Copper Amalgam Plates

For Saving Gold.

GOLD REMOVED FROM OLD PLATES AND REPLATED. Old Plates bought. Get our Reduced Rates. Five thousand orders filled. Twenty-five Medals Awarded.

SAN FRANCISCO GOLD, SILVER AND NICKEL PLATING WORKS,
653 and 655 Mission Street, San Francisco, Cal.
Telephone, Main 5931.

E. G. DENNISTON, - - - - - Proprietor.

Every description of work plated. Send for Circular.

The California

— THE CELEBRATED —

HAMMERED STEEL SHOES AND DIES.

Warranted Not To Clip Off or Batter Up. A HOME PRODUCTION.

Also, Best Refined Cast Tool Steel, Well Bit Steel, Heavy and Light Iron and Steel Forgings of all Descriptions.

PRICES UPON APPLICATION.

GEO. W. PENNINGTON & SONS, 218 and 220 Folsom Street, SAN FRANCISCO, CAL.

PROMOTER WANTED.

For a great mining enterprise. New region, Cascade mountains, Pacific coast. Extensive deposits of copper ores, containing gold and silver. Red Cripple Creek gold ore. Best discoveries secured by numerous claims, and opened; their value is a fact. Timber, water powers, coals and fireclay in abundance. A rare opportunity for an enterprising, moneyed and influential man. Partnership desired. References given and expected. Address "Promoter," this paper.

BRITISH COLUMBIA MINES,

Developed and Undeveloped.

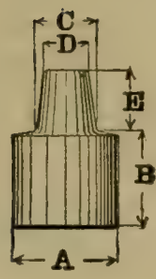
GOLD, SILVER, COPPER, LEAD, IRON AND COAL.

For Sale by BEAUMONT BOGGS (of British Columbia Board of Trade), Victoria, B. C.

RISDON IRON WORKS,

Office and Works: Cor. Beale and Howard Streets, San Francisco, Cal.

MINERS, ATTENTION!



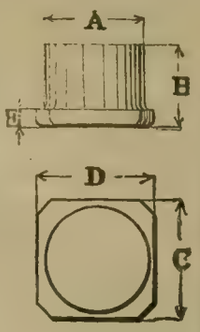
A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "

We beg to call attention to our "RISDON HAMMERED" Shoes and Dies, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.



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When Writing please mention the MINING AND SCIENTIFIC PRESS.

FULTON ENGINEERING AND SHIPBUILDING WORKS.

MINING AND MILLING MACHINERY,

ADAPTED TO EVERY DESCRIPTION OF MINING AND MILLING.

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—MANUFACTURERS OF—

MINING AND MILLING MACHINERY,

Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines, Quartz Mills, Manty Chili Mills, Rolls and Concentrating Machinery, Dodd Sigmoidal Water Wheel, PUMPS--Cornish and Other, Copper and Lead Furnaces, All Classes of Marine Work.

SHIP BUILDERS. ★ BUILDERS OF U. S. WAR SHIPS. ★ HYDRAULIC LIFT DOCK.

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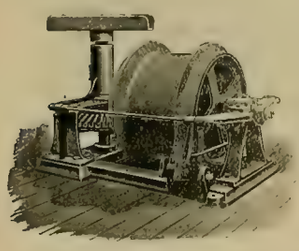
JOSHUA HENDY MACHINE WORKS,

No. 42 FREMONT STREET, SAN FRANCISCO, CAL.

—BUILDERS OF—

"Davis" Horse Power Whims. Ore and Rock Cars.



Specialty of

PROSPECTING, MINING and MILLING PLANTS.

ORE and WATER BUCKETS.

"T" RAIL OF USUAL WEIGHTS, EITHER NEW OR SECOND-HAND, FOR SALE CHEAP.

DEWEY & CO.

AMERICAN AND FOREIGN PATENT SOLICITORS

ESTABLISHED 1860.

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THE CHEAPEST PLACE ON EARTH TO OUTFIT A MINE

—IS AT—

THE J. H. MONTGOMERY MACHINERY CO., 1220-22 Curtis Street, Denver, Colo., U. S. A.

Just Listen—Reliable Common Sense Steel Whim, price reduced to $100. Steam Hoisters, $300 and up; hand hoisters $30; steel ore buckets all prices; prospectors' stamp mills $300. A 10-stamp mill, new, 850 lb. stamps, high mortars, latest improved. Only $800.

Ores tested and amalgamation and concentration mills built to fit the ore and guaranteed to save what we say. Coal Mine equipments, Screens, Jigs, Tramways, Arastors, Chilli an Mills, Ore Sacks, etc. Cornish Rolls, 12x20, weight 6,000 lbs., price $350; Feeders, Bumping Tables; Blake Crushers, 7x10, weight 8,100 lbs, only $250. Our 100 page illustrated catalogue FREE.

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F. M. Davis Iron Works Co.

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Concentration, Chlorination, Cyanide and Amalgamation Machinery.

Complete Plants for Ore Treatment

High Class Machinery and Experienced Modern Engineering.

WRITE FOR OUR PUBLICATIONS.

OFFICE AND WORKS:

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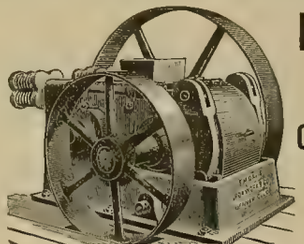

DAVIS CRUSHING ROLLS.

MINE BELL SIGNALS.

Adopted, Used and In Force in Accordance with State Law.

FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

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Mining and Smelting Engineer,
Albany Hotel, Oakland, Cal.

WADE & WADE,
Analytical Chemists and Assayers.
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Mining Engineer and Metallurgist,
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Will act as AGENT for the sale of RELIABLE Mining Property. Principals desiring valuable quartz or gravel investments at reasonable prices will do well to see what I may have. Only legitimate mining properties handled.

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Graduate of Columbia School of Mines. Expert on general mill work and amalgamation. Eighteen years' experience. Will report on Mines and Mills, and take full charge of Mining Properties. Address, 132 Market St., Room 15, San Francisco, Cal.

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Successor to Jehu & Ogden.
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Rooms 46 and 47 Montgomery Block.
Ore Assays, Analyses of Minerals, Metals and their Alloys, Etc.
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Assaying of Ores, $25; Bullion and Chlorination Assay, $25; Blowpipe Assay, $10. Full Course of Assaying, $50. Established 1864.
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HARVEY & HUTCHINSON,
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Mining and Metallurgical Work in All Branches.
Assays, Chemical Analysis of Ores and experiments on rebellious ores for treatment by cyanide or other processes. Surveys and reports upon mining properties.

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Chemical assayer; no loss by fire test; truth only; gold, 75c; gold and silver, $1; gold, silver and platinum, $1.85; copper, lead, nickel, zinc, etc., according to difficulty of precise determination; tests for chlorination, cyanide or proper method of treatment.

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MINING and CONSULTING
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Examine and report on mines, ore bodies, and all metallurgical processes connected therewith.
Practical mill tests, assays and analyses of ores and general analytical work undertaken at the
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References to leading mining men on application.

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MORGAN & CO.,
ASSAYERS, REFINERS & ORE TESTERS.
Guarantee reliable work.
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Preliminary reports on mines to determine advisability of extended investigation; assists upon large examinations. Intricate surveying, and geologic work for lawsuits. Thorough experience. Abundant references. Anglo-American code. Address, 1016 Pine St., S. F., Cal.

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Established Thirty-Eight Years. Special Attention Paid to Mining Business.

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Consulting Civil and Hydraulic Engineer.
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Agent for Sale of Mines,
530 California Street, San Francisco, Cal.

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Examinations and Reports Made on Mines and Mining Claims.
Correspondence solicited.
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Geological, exploring and prospecting work in the St. Helens (Cascade Mts., State of Wash.) copper and gold mining region. Mining claims, options and shares Coal lands. Correspondence solicited. References given and expected.

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Court Expertng in all branches of Chemical Technology. Working Tests of Ores and Investigation of Metallurgical and Manufacturing Processes. Consultations on all questions of applied chemistry. Instructions given in assaying and all branches of chemistry.

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Reports on mines, designs and superintends the erection of mining and milling machinery; makes analyses of ores, metals, soils, etc.; arranges for mill tests, and selects suitable processes for the treatment of ores. Correspondence invited. Address W. J. R. COWELL, Victoria, B. C.

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COMPLETE EQUIPMENTS FOR
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AIDION ANTI-FRICTION BABBITT METAL.
Superior to Any Anti-Friction Babbitt Metal on the Market.
——USED FOR——
High Speed Engines, Dynamos, Rolling-Mills, Steamships, Railroads, Saw-Mills, Cotton-Mills, Paper-Mills, Woolen-Mills, Silk-Mills, Jute-Mills, Rubber-Mills, Sugar-Mills, and all Machinery Bearings.

Gray's Harbor Commercial Co., Cosmopolis, Wash., state:
"We have never used any other than AIDION since we have carried same in stock, and further, that we have babbitted up the 'Thrust Box' on one of our steamers, where nearly every other kind of Babbitt had been used. In every case it had been unsatisfactory, but since putting in the AIDION we have had no trouble in any way whatever."

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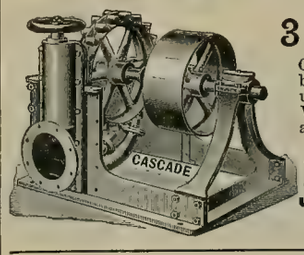
Special attention given to preparing plans for the Chlorination and Bromine Processes of Treating Gold Ores.
PATENTEE { Brown's Complete Automatic Mill Process. Brown's System of Mechanically Stirred Roasting, Cooling and Conveying Furnaces, Etc.
1607-8 Manhattan Building, Chicago, Illinois.

The General Gold Extracting Co., Ltd.,
PELATAN-CLERICI PROCESS.
Patented in U. S. and Other Countries. Capital, £100,000.
London Head Office.....8 Drapers Gardens.
Laboratory and Ore Testing Plant, 1530 Wynkoop St., Denver, Colo.

This process has a well-demonstrated merit in treatment of low-grade Gold and Silver Ores, especially those of a complex character, talcose and clayey combinations or slimes, which class of ore, as is well known, cannot be treated by leaching or lixiviation.
Gold and silver values, both fine and coarse particles, are by the PELATAN-CLERICI PROCESS recovered direct from ore without roasting as pure amalgam, and the precious metals are saved in the form of fine bullion without any refining costs.
F. CLERICI, Manager for U. S.

KENDALL GOLD AND SILVER EXTRACTION CO.
THE KENDALL PROCESS is the most efficient method of using cyanide for the extraction of precious metals from their ores. Wherever this process has been adopted the result has been increased percentages of values recovered and saving of time. Material reduction in consumption of chemicals has also been demonstrated with respect to several classes of ores.
All ores, without exception, amenable to cyanide treatment can be treated to better advantage by the Kendall Process. This can be accepted as an axiom.
The manager of one of the largest mines in the Mercur District, Utah, wires: "We now begin to understand dioxide process; last twenty days treated 220 tons per day of $26.50 ore, average of all tailings samples $0.83."
Owners of mines and reduction works can obtain full information on application to
KENDALL GOLD AND SILVER EXTRACTION CO.....47 Broadway, New York City.

TURBINE AND CASCADE WATER WHEEL
Adapted to all Heads from
3 Feet to 2000 Feet.



Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.
Send for a Pamphlet of either Wheel and write full particulars.
JAMES LEFFEL & CO.
SPRINGFIELD, OHIO, U. S. A.

ONE CENT Per Hour is Cheap.
That is what "WEBER" GASOLINE ENGINES COST to run per H. P. Simple, Safe, Reliable, Economical. Get Posted. *Address* WEBER GAS & GASOLINE ENGINE CO., *430 S. W. Boulevard*, Kansas City, Mo.

CONSOLIDATED

Kansas City Smelting and Refining Co.

Incorporated Under The Laws of New York.

Capital paid in.....$2,700,000.

Buyers of All Classes of

GOLD, SILVER, LEAD AND COPPER ORES,

Bullion, Mattes and Furnace Products,

GOLD BARS, SILVER BARS and MILL PRODUCTS.

SMELTING WORKS:
Argentine, Kas.; El Paso, Tex.; Leadville, Colo.

REDUCTION WORKS:
Argentine, Kas.

We use the following Cipher Codes at our Argentine Works: A. B. C. Code; Moreing & Neal's Code and Bedford McNeill's Code.

WORKS OF THE CON. KANSAS CITY SMELTING AND REFINING CO. AT LEADVILLE, COLO.

AGENCIES:
In United States—
Denver, Colo.
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Salt Lake City, Utah.
Spokane, Wash.
New York City, N. Y.
Chicago, Ill.
St. Louis, Mo.
In Mexico—
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City of Mexico
Chihuahua.
Pachuca,
Hermosillo.
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FOR PRICES, ADDRESS:
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C. D. Porter, Spokane, Wash.
H. A. True, 815 17th St., Denver, Colo.
J. H. Weddle, Leadville, Colo.
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THE FINLAYSON PATENT WIRE ROPE TRAMWAY.

THIS TRAMWAY IS THE BEST THAT HAS EVER BEEN PLACED ON THE MARKET. IT HAS NO RIVAL. IT IS STRICTLY AUTOMATIC AND ITS CAPACITY RUNS UP TO 1000 LBS. PER BUCKET. ANY ONE CONTEMPLATING THE ERECTION OF A TRAMWAY SHOULD INVESTIGATE ITS MERITS BEFORE PURCHASING ELSEWHERE. . . . . .

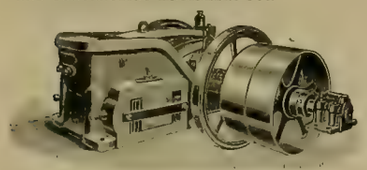
THE COLORADO IRON WORKS COMPANY, Denver, Colo.

SOLE AGENTS AND MANUFACTURERS.

WE ARE MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR Gold, Silver, Lead, Copper and Pyritic SMELTING FURNACES.

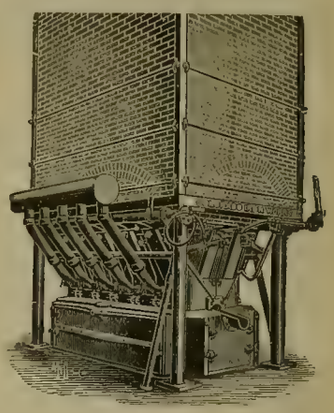
AMALGAMATION AND CONCENTRATION PLANTS.

Investigate Our Late Improvements in ORE CRUSHING MACHINERY.
We Guarantee Capacity Per Day to Any Degree of Fineness. . . . . .



Improved Black Hawk Ore Breaker.

OUR PATENT HOT BLAST APPARATUS for all Smelting Furnaces is a Success. A great economizer of fuel, and enlarges capacity of furnace.



Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No Cracks.

MINING, IRON AND WOODWORKING MACHINERY AND SUPPLIES

INGERSOLL-SERGEANT PISTON INLET AIR COMPRESSORS AND ROCK DRILLS

ENGINES AND BOILERS

PARKE & LACY COMPANY

21 AND 23 FREMONT STREET, SAN FRANCISCO, CAL.

NOTICE TO GOLD MINERS!

SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

San Francisco Novelty and Plating Works

Incorporated.

SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

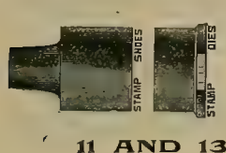
Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.



"Ferrite" and Projectile Steel Shoes and Dies.

Cheaper Than Cast Iron.

FOR FURTHER INFORMATION, ADDRESS

RIX COMPRESSED AIR MACHINERY COMPANY,

11 AND 13 FIRST STREET, SAN FRANCISCO, CAL.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DEC. 15, 1896.

573,253.—CAR COUPLING—G. Aabel, S. F.
573,073.—FLOWER STAND—R. E. Burke, Spokane, Wash.
573,390.—BEDSTEAD—A. Butzer, Deer Park, Wash.
573,074.—MAIL BAG FASTENER—M. S. Cody, Stockton, Cal.
573,391.—CAR AXLE BOX—S. Collins, Portland, Or.
573,214.—VEHICLES—J. Gambetta, Stockton, Cal.
573,215.—HAND PROTECTOR—C. H. Gleim, Portland, Or.
573,158.—METALLIC FURRING—J. T. McCormick, S. F.
573,099.—POTATO CUTTER—S. Mikami, Oakland, Cal.
573,417.—CAR AXLE BOX—J. L. Petithomme, Oakland, Cal.
573,104.—BICYCLE GUARD AND LOCK—H. A. Ranert, Portland, Or.
573,423.—CAN SOLDERING MACHINE—W. H. Smyth, Berkeley, Cal.
573,169.—ELECTRIC RAILWAY—A. Sprague, San Leandro, Cal.
573,057.—GARMENT FASTENER—O. Van Oostrum, Portland, Or.
573,058.—GARMENT FASTENER—O. Van Oostrum, Portland, Or.
573,059.—GARMENT FASTENER—O. Van Oostrum, Portland, Or.
573,060.—GARMENT—O. Van Oostrum, Portland, Or.
573,251.—COIN HOLDER—C. A. Webster, Oakland, Cal.
573,172.—BEER DRAWING APPARATUS—J. R. Young, San Jose, Cal.
29,298.—TRADE MARK—Kullman, Salz & Co., S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

RAILWAY RAIL JOINT.—C. J. Cochran, Sisson, Siskiyou, Co., Cal., assignor of one-half to Geo. H. Flett, of same place. No. 572,694. Dated Dec. 6, 1896. This invention relates to that class of railway rail joints in which fish plates are employed, and it consists in a novel means for fastening the plates to the web of the rail. The fish plates have enlarged portions or longitudinal slots with contracted extensions between them and the bolts are formed with shanks which turn in the holes of the rail webs and in the enlarged portions of the holes in the fish plates but cannot turn in the extentions. The heads of these bolts are adapted to pass horizontally through the holes in the rail webs and plates when they are in line, but when turned vertically to traverse said holes and extend beyond, the plates are moved sideways to throw the holes out of alignment and the bolts are locked. This prevents the plates from sliding out of place after they have once been locked, and secures the parts firmly together, at the same time making it easy to disengage them when required.

LADDER.—G. E. Chittenden, Niles, Cal. No. 572,693. Dated Dec. 8, 1896. This invention relates to the class of ladders. It consists essentially of uprights with steps extending between them and a top, this top being adapted to swing to and from the uprights, legs pivoted in said frame and adapted to swing sideways, said legs extending above their pivotal centers, a brace hinged at its forward end and slidably connected at its rear end with a guide frame and lines connecting this brace with the upper ends of the legs so that when the brace is moved down the legs are spread into position. The steps are secured to the uprights by metallic straps encircling the steps and uprights and secured to both. The latter is thus easily set up and adjusted upon any surface upon which it is necessary to use it.

THE OVERLAND LIMITED,
VIA
UNION PACIFIC.
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Only 4 1-2 Days to New York---4 1-2.

The Union Pacific is the only line running Pullman double Drawing-Room sleepers and Dining Cars San Francisco to Chicago daily without change. Only one change to New York; dining car service entire distance. Vestibuled composite buffet smoking and library cars between Ogden and Chicago.

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For information concerning this process for the reduction of ores containing precious metals, and terms of license, apply to
THE RUSSELL PROCESS CO.,
Park City, Utah.

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Is that which gives the largest amount of results in proportion to the amount expended. It is no use getting a lot of advertising at a cheap rate that results in little or no business.—Printers' Ink, N. Y., Dec. 2, 1896.

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MECHANICAL DRAWING
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HERCULES GAS, GASOLINE AND DISTILLATE ENGINES.
HOISTING ENGINES, 2 h. p. to 200 h. p
STATIONARY ENGINES, 1 h. p. to 200 h. p.
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Our newly designed and perfected DISTILLATE VAPORIZER insures a saving of 50% on cost of running. Just ½ your expense SAVED BY USING A HERCULES in place of ANY other. We make no exception.
NEARLY 3000 HERCULES HOISTING, STATIONARY AND MARINE ENGINES IN ACTUAL USE. HIGH GRADE.
We claim full power, automatic and positive adjustment regulating speed and consumption of fuel in proportion to work being performed No spring electrodes to burn out. All springs are outside. Point of ignition, speed and amount of fuel can be changed while engine is in operation.
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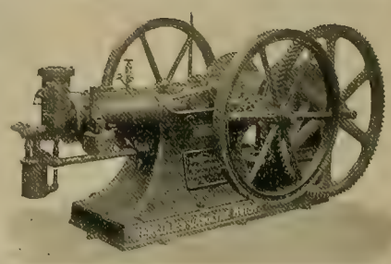
ESTABLISHED 1880. Address HERCULES GAS ENGINE WORKS,
WORKS: 215,217,219,221,223,225,227,229,231 Bay St. OFFICE: 405-407 Sansome St., San Francisco.



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Gold, Silver and Lead Ores and Concentrates
PURCHASED AT REDUCED RATES FOR TREATMENT.
SELBY SMELTING & LEAD CO.
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Consign shipments to Vallejo Junction, Cal.

COLORADO'S GOLD FIELDS.
Millions Upon Millions of Dollars in Gold Have Been Added to the World's Wealth.
It is a well-known fact that the richest and most famous gold mines in the known world are those of Colorado, many of which are paying to fortunate investors millions of dollars annually in dividends Some shrewd persons who invested only a few dollars are now receiving hundreds and thousands in profits, and, judging from present indications, there are more desirable chances to invest just now than ever before. New mines are discovered daily and old ones strike richer veins of gold.
In order to meet the great demand for reliable information about mines and mining camps, one of Denver's oldest and best known publishers has just issued a handsomely illustrated book accurately describing every mining camp in the entire State of Colorado, giving scores of truthful photo-engravings of famous mines, mountains, cities, etc. Cripple Creek, the world's wonder, is fully described; also a correct map of the district. Narratives of how many poor people have become wealthy by judicious investments in gold mines, and sketches of former prospectors who are now fixed for life. Tells how to avoid unscrupulous brokers and sharpers. The volume has been carefully compiled by a disinterested author and every statement made is guaranteed to be true All terms and phrases of miners fully explained; tables showing the State's production of gold and silver for 35 years past. The publisher will send by return mail a copy of the above great book upon receipt of $1 (currency or stamps), which also includes a full-paid yearly subscription to his big 56-column weekly family paper, the *Illustrated Sentinel*, of Denver, Colorado (established 1890). Clubs of 8 and six books, $5. The paper contains each week all the latest mining news and illustrations of Rocky mountain scenery, also true stories of love and adventure.

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Contractor for the erection of Stamp Mills, Roller Mills, Reduction Works, Saw Mills (both circular and band), Aerial Wire Rope and Surface Tramways, etc., etc. Putting in machinery, shafting, etc., of all kinds promptly attended to. Estimates given on plants, complete, including machinery, building material, etc.

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No dust. No ashes. Cheap, effective, economical, portable and automatic.
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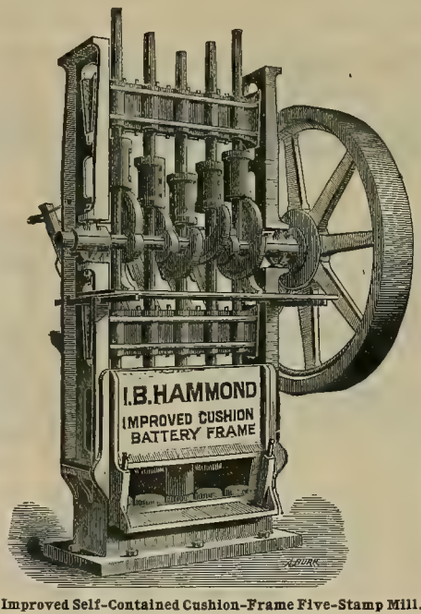
MANUFACTURERS OF
Stamp Mills, Ore Feeders
DETACHABLE BUCKET WIRE-ROPE TRAMWAYS,
Roller Grinding Pans, Desulphurizing Furnaces, Etc.



Improved Self-Contained Cushion-Frame Five-Stamp Mill.
Patented in the United States and Foreign Countries.

The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Self-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill.
FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.
SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.
THIRD: The Large Amount of Space Saved.
Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.
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WILL INVESTIGATE only thoroughly bona fide properties, either Mines, Prospects or Mineral Lands, whose owners are willing to make reasonable terms. When sending reports on properties also send terms on which you are willing to sell or lease.

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Assay and Chemical Work Done on Reasonable Terms.
Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.
DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star mining district, Storey county, Nevada.
Notice is hereby given that at a meeting of the Board of Directors, held on the 24th day of November, 1896, an assessment (No. 25) of fifteen (15) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 29th day of December, 1896, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 18th day of January, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors.
ALFRED K. DURBROW, Secretary.
Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

JAMISON MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, on Jamison Creek, near Johnsville, Plumas County, California.
Notice is hereby given that at a meeting of the Board of Directors, held on the 27th day of November, 1896, an assessment (No. 9) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 25th day of January, 1897, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 22nd day of March, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors.
SAM W. CHEYNEY, Secretary.
Office—Room 50, 120 Sutter street, San Francisco, California.

CON. CALIFORNIA AND VIRGINIA MINING Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 8th day of December, 1896, an assessment (No. 7), of 25 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 14th day of January, 1897, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 4th day of February, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
By order of the Board of Directors.
A. W. HAVENS, Secretary.
Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, California.

HALE & NORCROSS SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, State of Nevada.
Notice is hereby given that at a meeting of the Board of Directors held on the 8th day of December, 1896, an assessment (No. 110) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 3, No. 331 Pine street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on MONDAY, the 11th day of January, 1897, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 1st day of February, 1897, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
By order of the Board of Directors.
R. U. COLLINS, Secretary.
Office—Room 3, Stock Exchange building, No. 331 Pine street, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.
Notice is hereby given, that at a meeting of the Board of Trustees, held on the 14th day of December, 1896, an assessment (No. 80) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 19th day of January, 1897, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on TUESDAY, the 9th day of February, 1897, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Trustees.
ALFRED K. DURBROW, Secretary.
Office—Room 69, Nevada Block, 309 Montgomery St., San Francisco, California.

WANTED.—Position as assayer, or charge of mill or mine. Have practical experience in amalgamation, concentration and mining. Had thirty years' experience. Can give best of references. Address "Assayer," 1212 South O Street, Tacoma, Washington.

IMPROVED MINERS' LANTERN.
A light, simple, cheap and efficient Lantern which will remain lighted in the strongest drafts. County or State rights for sale on royalty. MRS. HATTIE DELZELL, Jackson, Cal.

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W. W. MONTAGUE & CO.
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Riveted Iron and Steel
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For Hydraulic Mining, Mills and Power Plants.
IRON CUT, PUNCHED AND FORMED, AND TOOLS SUPPLIED FOR MAKING PIPE ON THE GROUND WHERE REQUIRED.
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H. CHANNON COMPANY,
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WIRE ROPE. MANILA ROPE, TACKLE BLOCKS, CHAIN and CHAIN HOISTS, HAND POWERS and HOISTING ENGINES.
Send for our new Catalogue.
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THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from C. C. Beever, in the Union mine, near Brownsville, Yuba county, to deposit tailings in a ravine below the mine; from C. P. Saxton, in the Saxton mine, near Genesee, Plumas county, to deposit tailings in Little Grizzley creek; from O. D. Campbell, in the Sailor Flat mine, near Blue Tent, Nevada county, to deposit tailings in Sailor Flat canyon; from W. H. De Mott, in the Blue Tent mine, near Blue Tent, Nevada county, to deposit tailings in an old pit; from Mathias Diehl, in the Frank Milan claim, near Camptonville, Yuba county, to deposit tailings in Mill creek; from R. M. Cunningham and Thomas Phillips, in the Montre placer mine, near Pike City, Sierra county, to deposit tailings in a ravine below the mine; from Cy. Mulkey, in the Cedar Creek Consolidated mines, near Fair Play, El Dorado county, to deposit tailings in Cedar creek; and from Al. Petty, in the Lucot mine, near Volcano, Amador county, to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on January 4th, 1897, at 1:30 P. M.

ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Thorpe Mining Company will be held at the office of the Company, Room No. 44, Phelan Building, San Francisco, California, on WEDNESDAY, the 30th day of December, 1896, at the hour of 1 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Monday, December 28th, at 3 o'clock P. M.
A. F. FREY, Secretary.

WANTED.
A Large Gold or Copper Property, located anywhere from Alaska to Mexico. Must have ore body developed 200 to 300 feet deep, with a large amount of payable ore actually in sight. Or a property with a large body of payable ore exposed sufficient to warant extensive development work. No small property wanted. Send complete description to M. KUHN, 12 Front St., San Francisco.

Wanted, Position
In Gold, Silver or Copper Mine as Underground Foreman.
Twenty years' experience. I speak Spanish, and know how to handle men. Don't object going to Mexico. Address "Foreman," this office.

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The German Savings and Loan Society,
526 California Street.
For the half year ending December 31, 1896, a dividend has been declared at the rate of four and twenty-six hundredths (4 26-100) per cent per annum on Term Deposits and three and fifty-five hundredths (3 55-100) per cent per annum on Ordinary deposits, free of taxes, payable on and after Saturday, January 2, 1897. GEO TOURNY, Secretary.

DIVIDEND NOTICE.

SAN FRANCISCO SAVINGS UNION,
532 California St., Cor. Webb.
For the half year ending with the 31st of December, 1896, a dividend has been declared at the rate per annum of four and two-tenths (4.2) per cent on Term Deposits and three and five-tenths (3.5) per cent on Ordinary Deposits, free of taxes, payable on and after Saturday, January 2, 1897.
LOVELL WHITE, Cashier.

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In the improved form in which it is now offered to the public, it is universally admitted to be the most practical, powerful and successful machine o the kind in America, and the only machine in exist ence that can be successfully operated on hill land
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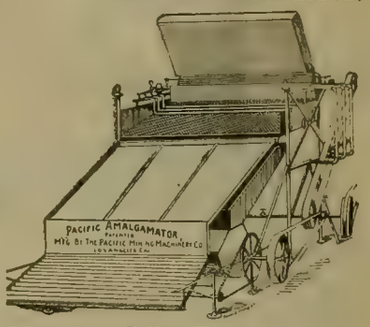

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A Guarantee With Each Machine.
This machine is the finest gold saver for both placer mines and quartz mills. No other plate necessary in mills where the Pacific Amalgamator is used. It is constructed almost entirely of metal; it can be transported on pack train. Possesses a large amount of silvered amalgamating plate surface. No scouring of amalgam. Any ordinary amalgamator can operate the machine with good success. Send for catalogue.
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Established 1852. Incorporated 1895.
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63 First Street, San Francisco, Cal.
Manufacturers and Importers of
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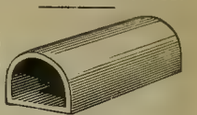
FURNACES, SCALES, BALANCES, WEIGHTS, ETC.
ALSO, MINE AND MILL SUPPLIES, CHEMICALS AND CHEMICAL APPARATUS.



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Agents for Baker & Adamson's Chemically Pure Acids. A full stock always on hand.
Nitric Acid, sp. gr. 1.42; Muriatic Acid, sp. gr. 1.20; Sulphuric Acid, sp. gr. 1.845.
PRICES ON APPLICATION.

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Assaying Gold
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Silver Ores.
By C. H. AARON.
This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning.
The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores,") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy writers. The want of such a work has long been felt. It will be very desirable in the hands of many.
Table of Contents:—Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.
The volume embraces 126 12-mo pages, with illustrations, well bound in cloth; 1896. Price **$1.00** postpaid. Sold by the **Mining and Scientific Press,** 220 Market St., San Francisco.

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For Hydraulic Purposes, made from the Best Sheet Steel, Single or Double Riveted, Dipped or Undipped.

We will ship Pipe cut and punched, to be riveted at the mine, making a saving in freight charges.

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Steam Boilers, Ore Cars, Ore Buckets, Etc.,
SHEET IRON WORK OF ALL KINDS.
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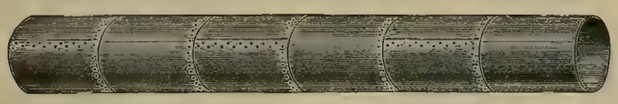
310-312-314 REQUENA STREET, LOS ANGELES, CAL.

Mining Pipe!



STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.
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The Truax Pat. Automatic ORE CARS.
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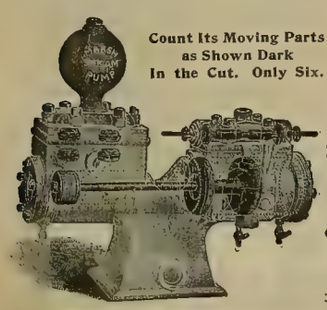

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ABSOLUTE ACTUATION AND REGULATION.
PATENT SELF-GOVERNING STEAM VALVE.
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NO OUTSIDE VALVE GEAR.

Maximum of Strength, Simplicity and Service.
Minimum of Weight, Wear and Waste.

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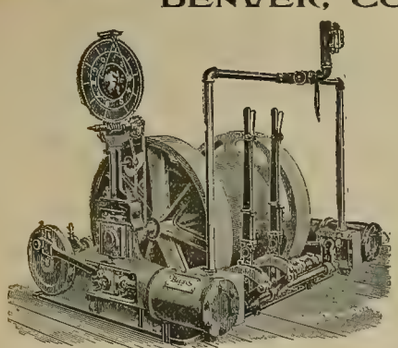

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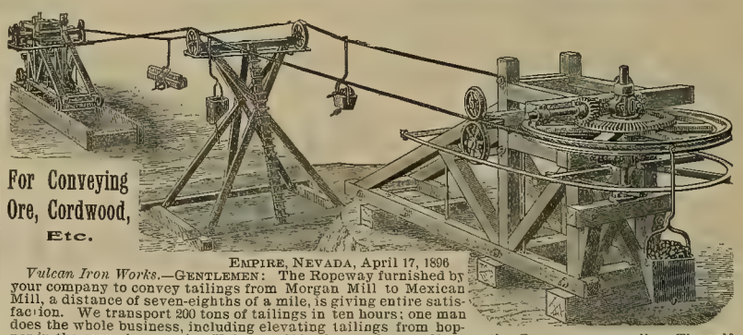

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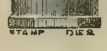
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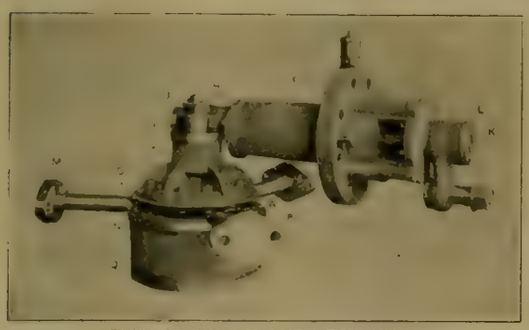

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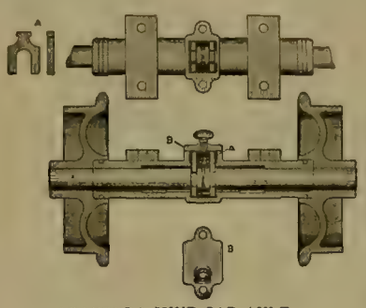

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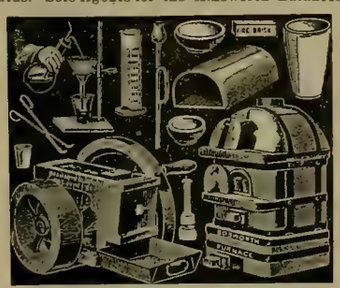

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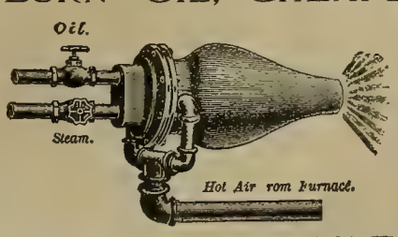

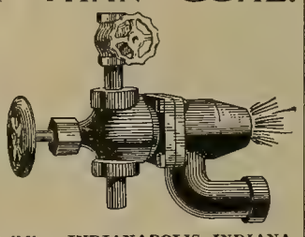

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611 and 613 FRONT ST., San Francisco, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 24, 1896.

Throughout the year business was confined to actual requirements, which had its influence on all branches of trade, which, in turn, had a direct bearing on manufacturing and other industries. This conservatism was ushered in with the commencement of the year and became more pronounced as the months passed, particularly during the Presidential election campaign. While business was conducted on conservative lines, this very conservatism operated to restrict the number of failures. The gold mining industry has been one of the mainstays on this coast of general business. With a falling away of the interest felt in Europe in the African gold mines, idle capital there sought new fields for operation and naturally this coast was given preference. Experienced mining engineers in this country and abroad were brought into service for the purpose of investigating and reporting on mines offered for sale. The largest sale effected was the controlling interest in a copper mine at Butte, Montana, which ran into many million dollars, the exact amount never having been correctly given, either by sellers or buyers. This purchase attracted attention at all commercial centers and was the means of leading to inquiries for other copper mines, under the belief that the copper interests were being concentrated in the hands of a powerful European money combine that would bend its resources to keep the price of copper up.

The sales of gold mines this year are said to have been the largest on record; not only in numbers, but also in money consideration. Several sales were negotiated and carried out which ran from $1,000,000 up, while sales of from $100,000 up were largely in evidence. The buyers were Eastern and European persons. The latter were after the large propositions, those that had been developed, so as to have a good bullion output, with the promise of an increase with more thorough development work. The Americans have been content with the smaller propositions. It is quite impossible to get a correct list of the number of mines bought and the aggregate sum of money paid, and those in position to know say it largely exceeds the record of any former year. Large as it has been, the year 1897 promises to rival it, for the interest taken in our mines abroad seems to intensify, and with its growth more capital is offering for investment. Mining engineers of national reputation unequivocally assert that they expect to report on more mines in the next year than during any previous year. They say that the only thing which may prevent many negotiations going through will probably be the high view of sellers. For silver mines there has been no inquiry, as moneyed men do not seem to care for them unless they are large producers, owing to the low price of silver bullion.

During the past year silver bullion has ruled low, with the tendency downwards, although for the past month it has been steadier. The general legislation by all large countries against silver, has not lost its unfavorable influence. There has been a good demand from the arts and for shipment to India, and fair shipments to the Straits and Japan; yet China has taken very considerably below her yearly average. With improving business abroad, there has been more silver coin going into circulation, which may call for more to be coined in Europe. It is also stated that Russia's monetary reform includes the coining of silver as well as gold. The world's output of silver is steadily decreasing, particularly in the United States.

The consumption of copper during the past year has beat all former records. In Europe it has increased fully one-third, due to renewed activity in shipbuilding and the more general use of electricity. The large increased consumption caused the mines in this country to increase their output, and, although it is nearly 50 per cent more than last year, still the available supply of copper in America and abroad is comparatively small. The better-informed dealers in the metal at home and abroad say that the consumption will be larger next year than it was this, which will tax the mines to meet. The market price of the metal has not varied much. Dealings seem to have been confined to legitimate wants, and, in the absence of speculation, prices were fairly well maintained at nearly steady figures.

Quicksilver has been quiet throughout the year, with very few changes in market values. The consumption is not so large as it was a few years ago, owing to the depression in silver mining and the more general use of silver by mirror-glass manufacturers. The low prices of silver bullion and its superiority for backing purposes cause it to come into more general use. The output of the mines are under fair control at home and abroad. Mexico and Central America are our largest foreign consumers on this coast.

Lead has held to fairly low prices. The year opened with heavy supplies at home and abroad, but with a falling off in the output the consumption has caused a steady reduction in stocks, which is having a beneficial influence. Owing to the depression in trade in this country the consumption in the United States fell away, but improving trade abroad caused an increase in the European demand.

Pig tin sold at comparatively low prices throughout the year. The low prices for silver enabled imports to be made at lower figures from the Straits. The tinplate industry in this country has made rapid strides. Our manufactures have a yearly capacity of over 5,000,000 boxes, which has reduced foreign imports, owing to home consumers giving preference to American.

Pig iron held to lower prices until after the election, when slightly higher prices set in. This improvement has caused more furnace men to start up, and although the consumption promises to be large, yet the output, it is feared, will be excessive and cause continued low prices. There has been a steady growth in the export movements from Atlantic seaboard ports. This demand promises to be an important factor in the future. The mines on this coast have not increased their output. All turned out find a ready sale up north and in this city.

Coal held to low and unsatisfactory prices to coal miners, although towards the close of the year there is a strengthening in market prices in sympathy with higher freights from Europe and Australia. Coast mines did not increase their output which had the tendency to keep prices from going too low. The consumption of both steam and household has been quite free, and notwithstanding heavy imports at San Francisco stocks are not excessive for the season of the year. Coal from Cook's Inlet, Alaska, is beginning to seek our market. The deposits are said to be very extensive. The Elsinore coal meets a large part of the demand in southern California. The outlook for next year is favorable for better average prices.

Powder has ruled very low owing to strong competition between manufacturers. The low prices brought in heavy orders which have taxed the capacity of the manufacturers to meet. Towards the close of the year there are rumors of a combine. The advance in the market value of the shares seems to give color to the reliability of the reports, and if true higher prices will rule before long.

The export movements in lumber have been on a large scale. The aggregate shipments are said to be double that of last year's. Shipments from up north to the coast have also been heavy. Prices have not varied much, although a movement was inaugurated to advance them.

General trade has a holiday appearance. Importers, manufacturers and wholesale dealers are engaged in posting up their books, taking account of stocks and getting out a balance sheet at the close of the year, so as to learn on which side of the ledger their business was carried on this year. After the holidays business will begin to take on new life, and, from the present outlook, next year's business promises to be on prosperous lines. This opinion is grounded on good crop prospects and better average prices for farm products and continued activity in the gold mining industry. The opinion prevails that iron workers will do a larger business than was done this year in machinery and structural material.

The local money market is practically unchanged. Already quite a number of incorporated companies have declared dividends payable in next month. This will be followed by others during the week. The supply of available funds in the commercial and savings banks are larger than at this time last year, which gives assurance that after the turn of the year the rates of interest will shade off, unless there is an active demand for money of which at present, there are no signs. Bank suspensions at Chicago and St. Paul have no effect here for our institutions are conducted on much safer lines than those that suspended.

Eastern advices report easy money markets at financial centers on the Atlantic seaboard, with an excess of funds offering at New York. It seems that the suspension of four banks at Chicago and two at St. Paul has not had a serious effect. No failures in business circles have followed the suspension which indicates that solvent financial institutions there are caring for large depositors of the defunct banks. Some small sums are reported on some of the savings banks but without having any bad effect so far as advices report to this writing. That the worst is over seems to be evidenced in a decided upmove to-day in the Chicago market for wheat. This article of speculation is a good barometer as to the financial condition and general situation there.

New York Silver Prices.

NEW YORK, Dec. 24.—Following are the closing prices for the week:

	—Silver in—	
	London.	N. Y.
Friday	29⅞	65¼
Saturday	29⅞	65¼
Monday	29⅞	65¼
Tuesday	29⅞	65⅛
Wednesday	29⅞	65⅛
Thursday	29⅞	65⅛

	Copper.	Lead.	Iron.	Tin.
Friday	11 35	3 02½	11 00@13 00	12 95
Saturday	11 40	3 02½	11 00@13 00	12 95
Monday	11 40	3 02½	11 00@13 00	13 00
Tuesday	11 40	3 02½	11 00@13 00	13 00
Wednesday	11 40	3 02½	11 00@13 00	13 00

The local bullion, money and exchange quotations current are as follows:

Commercial Loans, % per annum	7@8
Commercial Loans, prime	6@8
Call Loans, gilt edged	6@7
Call Loans, mixed securities	7@8
Mortgages, prime, taxes paid by lender	6@8
New York Sight Draft	12½c Prem
New York Telegraphic Transfer	15c Prem
London Bankers' 60 days	$4.84½
London Merchants	$4.84
London Sight Bankers	$4.88
Refined Silver, per oz., 1000 fine	65⅛
Mexican Dollars	51¾@52½

SILVER.—The market has held to fairly steady figures throughout the week, although at the close it is a shade lower. The last steamer for the Orient took out $7000 in bullion for Hongkong and $117,000 for Japan. The East reports a continued fair export movement. From London our advices state that the holiday season interferes with the movement, although India is still taking quite freely. Mail advices from London give the exports of silver to India, and the Straits from Jan. 1 to Dec. 3, as follows:

	1896.	1895.	Changes.
To India	£4,372,778	£3,435,016	Inc. £937,682
To China	725,985	1,630,023	Dec. 904,038
To the Straits	700,396	731,783	Dec. 31,387
Total	£5,799,159	£5,796 902	Inc. £2.257

MEXICAN DOLLARS.—The market holds steady. Receipts show an increase. The last steamer for the Orient took out 211,078 dollars for Hongkong and 175,000 for Japan.

QUICKSILVER.—The market is quiet. The last steamer for Mexico and Central American ports took out 121 flasks.

The market is quoted as follows:

Domestic trade, per flask	36 50

For export, quotations are nominal but less than for home.

COPPER.—The market is quiet but steady, with apparently a firmer undertone. The East reports slightly better prices, with a good demand for the season of the year.

Ingot, jobbing	14⅛@—
Ingot, wholesale	13⅛@—
Sheet copper	17 @—
Bolt	¼ & 5-16, 20c; ⅜ and larger, 17c
Lake Superior Sheathing	20

LEAD.—The tone seems to be firmer, although there is an absence of a demand. Eastern and European markets are reported stronger.

Pig	— @ 3 75
Bar	— @ 4 00
Sheet	— @ 5 25
Pipe	— @ 4 50

SHOT.—There is a good seasonable deanmd. Our market is quoted as follows:

Drop, sizes smaller than B, per bag of 25 lbs	$1 20
Drop, B and larger sizes, " "	1 45
Buck, Balls and Chilled, do, " "	1 45

ANTIMONY.—Our market is quoted at 7½@8c in a jobbing way. New York mail advices quote 7¼c for Cookson's, 6½@6¾c for Hallett's and 6¼c for Japanese.

BORAX.—The market is quiet but firm at quotations. The last steamer for Panama took out 171,700 lbs en route for New York.

The market is quoted as follows:

Refined, in car lots	5
Refined, in sacks	4¾
Powdered, in car lots	4½
Concentrated, "	5

TIN.—There is nothing new to report either in our market or at the East.

Pig, per lb	14¼c@—
Plate, I C coke, heavy, per box	— @$4 05
" " " light, "	— @ 3 95

IRON.—The market is quiet, with no demand reported and none looked for until after the holidays. Imports of American and English were fairly large the past week. Rogers, Brown & Co. of Cincinnati write: "The feeling obtains generally that the coming year is to be one of great prosperity, and during the quiet period prevailing preparations are being made for the expanded business expected. Prices current are somewhat irregular, owing to the presence on the market of some warehouse lots and the eagerness of a few furnaces to realize on certain grades that have accumulated."

COAL.—Notwithstanding the heavy arrivals the market has not gone off, but on the contrary, is firmer for some kinds. About all that has come to hand was placed prior to arrival. The demand from yards is said to be good.

COKE.—The market is quoted as follows:

Gas Companies'	— —
English, to load	9 00 @ — —
" spot, in bulk	9 00 @ 10 00
" in sacks	11 00 @ 12 00
Cumberland	— — @ — —

POWDER.—It begins to look as if a combination is being formed to promote better prices the coming year.

The market is quoted as follows:

Hercules, No. 1*, per pound	11½c
" No. 2, " "	8½c

Mining Share Market.

SAN FRANCISCO, Dec. 24, 1896.

Mining shares the past week showed more strength at slightly higher prices. There were no fluctuations, and consequently outside operators have not been attracted to them. It is said that some of the buying was by persons who had sold short at high figures, and wished to fill so as not to have them out during the holidays. The selling was, to a considerable extent, by holders not wishing to carry them over the holidays in the face of more assessments to be levied in next month. So far as the news from the mines, either on the Brunswick lode or Comstock lode, is not of a character to inspire confidence with the outside dealers, but the work that is being done in two or three cause better informed operators to look for good results within the next month or two. The activity in the Hale & Norcross shares, noted last week, seems to have subsided, and dealing in Chollar to be coming to the front. The advance last week in Hale & Norcross, and the strength since shown, is owing to the resumption of work on the 900-foot level, and a strong probability of it striking the continuation of the ore found on the same level in Savage. Those in position to know think that if the ore is struck, quite a revival of activity in shares will follow. The strength in Chollar is said to be due to favorable news from the work on the Brunswick lode. The Bodie shares were stronger, with Bodie the leader. What the strength is based on it is hard to say, for those in position to know profess ignorance.

The news from the Brunswick lode is uninteresting. Official letters are valuable only from a statistical point of view, but operators take more interest in ore strikes than in the number of feet run each week from points that would often puzzle the proverbial Philadelphia lawyer to make clear to their minds. No ore is reported to have been run into in any of the mines working on that lode, but as the work is in unprospected or unknown ground the hope is entertained that any day a body of ore may be struck. It is this chance which makes the shares a gamble and causes outsiders to pay assessments. In Occidental they are working on the 550-foot and 750-foot levels, but with no encouraging formation reported. In Chollar they have men at work on its ore streaks on the 300-foot and 400-foot levels. During the week 49 tons of ore were extracted and sent to the Nevada mill. What it assayed in gold and silver official letters are silent. On the 400-foot level work is continued in the two crossdrifts while driving ahead the south drift. Stringers of quartz are cut by the crossdrifts, while the south drift was, at last advices, in a vein of porphy-

MINING ASSESSMENTS.

Company and Location.	No.	Amt.	Levied,	Delinq't and Sale.	Secretary.
Alta S M Co, Nev	54	5c	Dec 14	Jan 18..Feb 8	J E Jacobus, 309 Montgomery
Bullion Con G M Co, Cal	10	10c	Nov 30	Jan 11..Feb 10	C A Grow, Mills Bldg
Channel Bend M Co	5	2c	Nov 9	Dec 12..Jan 2	J P Langborne, 39 Sutter
Con Cal & Va M Co, Nev	7	25c	Dec 8	Jan 14..Feb 4	A W Havens, 309 Montgomery
Crown Point G & S M Co, Nev	69	10c	Dec 9	Jan 13..Feb 3	Jas Newlands, Mills Bldg
Eureka Con Drift M Co	5	5c	Nov 24	Dec 28..Jan 18	D M Kent, 330 Pine
Exchequer M Co	39	5c	Nov 14	Dec 17..Jan 11	Chas. E Elliott, Nevada Block
Gould & Curry S M Co, Nev	80	15c	Dec 14	Jan 19..Feb 9	A K Durbrow, 309 Montgomery
Hale&Norcross S M Co, Nev	110	25c	Dec 8	Jan 11..Feb 1	R U Collins, 331 Pine
Horsefly G M Co	1	25c	Nov 4	Dec 21..Jan 20	R T Ward, 610 Clay
Horse Shoe Bar Con M Co	5	10c	Oct 29	Dec 5..Dec 26	D M Kent, 330 Pine
Jamison M Co	9	5c	Nov 27	Jan 25..Mar 22	Sam W Cheyney, 120 Sutter
Occidental Con M Co	25	15c	Nov 24	Dec 29..Jan 18	A K Durbrow, 309 Montgomery
Overman S M Co	76	10c	Nov 28	Dec 31..Jan 22	Geo D Edwards, 414 California
Silver King M Co	15	25c	Oct 26	Dec 7..Jan 5	J W Pew, 310 Pine
Thorpe M Co, Cal	4	5c	Oct 14	Dec 22..Jan 9	A F Frey, 567 Market
Ybarra G M Co, Lower Cal	6	10c	Dec 4	Jan 6..Jan 25	Jas Coffin, 132 Market
Reward G M Co	16	2c	Nov 11	Dec 14..Dec 30	S W Backus, Mills Building
Reward G M Co, Cal	17	3c	Dec 19	Jan 20..Feb 5	S W Backus, Mills Building

ANNUAL MEETINGS.

Company and Location.	Secretary and Office in S. F.	Date.
Thorpe M Co, Cal	A F Frey, 44 Phelan Bldg	Dec 30

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ry, which has a promising appearance. Shaft No. 1 is down nearly 800 feet on an incline. Drifting has not been commenced on the 500-foot level. Active work is being done by both Best & Belcher and Gould & Curry on the levels heretofore reported in this department. In Savage work is continued in the 400-foot level, but no encouraging news is reported and none looked for.

From the Comstock lode our advices are practically unchanged since our last week's issue; yet this, it is said, can be changed for the better any day the powers that be desire. A large portion of the work seems to be of a kill-time character—that it is killing the patience of stockholders does not admit of a doubt, and unless ore strikes are made it will be hard to collect assessments. The official letter from Alta reports that work has been suspended on the Keystone ledge. In the east drift, on the 725-foot level, they continue to cut stringers of quartz assaying well in gold, which inspires the belief it may lead to quite a body of ore. In Overman work is still on the 900-foot level. A few tons of ore are raised each week. From milling of 61 tons of ore over $1200 gross was returned in bullion. Seg. Belcher raises a few tons of ore, but hardly enough to pay expenses, notwithstanding it is said to be mostly gold. The number of tons of ore raised by Belcher has run down to almost 30 tons a week. There is a continued silence where work is being done. This is contrary to law, as lately decided by the Supreme Court, which some of the directors may find out to their cost. In Crown Point work is being done on the levels heretofore reported. From Yellow Jacket nothing comes to hand. Confidence raises a few tons of ore each week. The long joint west cross-drift that is being run by Confidence, Challenge, and Con. Imperial is being driven slowly ahead. It is out nearly 900 feet. Work in Alpha is continued on the 550-foot level, with nothing of importance reported. In Bullion they are still drifting towards Potosi. No work is being done in either Chollar or Potosi. Some think that work has been stopped so as to resume it in a less favorable formation, on another level. Work in Hale & Norcross is on the 900-foot level. It is reported that they will run for the continuation of the ore found last spring in Savage. From Savage, Gould & Curry and Best & Belcher our advices do not report any change in the work. At the annual meeting of the shareholders of Gould & Curry it was voted to lease the upper levels of the old mine on the Comstock to J. H. Kinkaid for a term of five years. In Con. Virginia active work is still the order on the 1000-foot to the west, and 1650-foot level to the east, while on the 1750-foot level they are at work on several floors. The news, as a whole, is flat, stale and unprofitable to outside operators. In Ophir they continue work on the 1000-foot and central tunnel levels, with nothing new reported. In Mexican, Union, Sierra Nevada, Utah and Andes the official letters report work on the levels they have been working on for some time past. Nothing outside of porphyry was reported found the past week.

The following illustrates the changes of the week:

MINES.	Dec. 17.	Dec. 23.
Alpha		
Alta Consolidated	$ 04	$ 03
Andes	14	14
Belcher	32	45
Best & Belcher	58	47
Bodie		66
Bullion	11	09
Challenge		34
Chollar	90	85
Confidence	75	87
Consolidated California and Virginia	1 15	1 10
Consolidated New York		
Crown Point	20	23
Exchequer		
Gould & Curry	35	26
Hale & Norcross	1 30	1 15
Justice		
Mexican	47	42
Ophir	1 00	92
Overman	05	
Potosi	62	
Savage	35	31
Sierra Nevada	46	43
Union	41	38
Utah	05	
Yellow Jacket		34

Under date of December 18th F. H. Pettingell writes from Colorado Springs, Colorado: "Prices all along the line must advance, whether Eastern capital steps in or not. If we were more indifferent to the fault-finding and ever-suspicious Easterner, who, aside from their capital, represent little but ingratitude and a capacity for magnifying errors in the judgment of their broker, we would have less to regret. Not a few times in our experience have we seen one of this class make thousands of dollars by the judicious advice of his broker, and then by some little mistake on the part of the latter lose a few hundred, raise a hue and cry, and almost sacrifice his broker's reputation by bitter criticism, both in public and private. * * * Whether the great advance that is universally predicted follows the incoming of the new year or not, few losses will be sustained by investing with care in almost anything."

San Francisco Stock Board Sales.

SAN FRANCISCO, December 23, 1896.

9:30 A. M. SESSION.

300 Alta	03	700 Crown Point	23		
850 Belcher	45	200 Gould & Curry	26		
600 Best & Belcher	47	100 H. & N	1 15		
400 Challenge	34	100 Mexican	42		
300 Chollar	88	300 Ophir	92		
300 Con Cal & Va	1 10	100 Scorpion	02		
150 Confidence	87	500 Yellow Jacket	34		

SECOND SESSION—2:30 P. M.

150 Con Cal & Va	1 10	100 Union	38		
200 Savage	31	100 Alta	03		
200 Yellow Jacket	30	600 Occidental	05		
1050 Belcher	39	200 Andes	14		
500 Sierra Nevada	43	350 Jackson	50		
100 Bullion	09	500 Bodie	66		

INDEX TO VOLUME LXXIII

—OF THE—

Mining and Scientific Press

FROM JULY TO DECEMBER, 1896.

A

Abandonment and Relocation 254
Accuracy of Chemical Analysis 338
Aconcagua 133, 250
Activity in Development of Copper Mines 520
Activity in Mining Enterprises 192
*Advance in Gravel Mining 253
Advertising Business 498
Aerial Torpedo 89
Aerostatic Railway 525
Africa's Condition 442
Small Yield 460
*Air Compressing on a Large Scale 213
*Compressor for Montana 333
Hoist Table 30
Tester 239
Alaska, Gold Output 96, 419
Mines ..... 11, 35, 47, 67, 75, 107, 117, 159, 179, 199, 262, 303, 335, 355, 363, 375, 382, 397, 406, 418, 426, 467, 487.
Prices 355
Alaska-Treadwell G. M. Co 67, 107, 375
Alcoholic Drinks 524
Allis, E. P. Co 90, 118, 455
Alloys and Amalgamation of Gold 358
Of Refractory Metals 30, 238
Aluminum 30, 102, 174, 239, 299, 483
Bronze Casting 70
Aluminum's Electrical Conductivity 152
Amador Co. Mines ..... 10, 34, 54, 74, 94, 107, 116, 138, 151, 158, 178, 198, 222, 242, 262, 282, 302, 322, 342, 362, 382, 406, 426, 446, 466, 486, 506, 526.
*Amalgamator, New 105
Amalgam Accumulation on Copper Plates ..... 152, 172, 194, 216, 277.
Amalgams of Chromium and Mercury 69
Alameda County Miners' Association 523
American and European Mining Methods 169
Inst. Mining Engineers 255
Mining Engineers 498
Newspaper Directory 518
Pig Iron 308
Society Civil Engineers 6
Anaconda Mine Output 235, 255, 293, 355, 419, 459, 499
Annual Report of the Gen. Land Office 335
Anti-Debris Association 47, 67, 131, 151, 335
Antimony in Montana 499
Appreciates a Good Thing 89
Archæological Discoveries, Recent 217
Argentiferous Sulphide Ore, Treatment of 131
Arizona Mines ..... 11, 35, 55, 75, 95, 107, 117, 139, 159, 179, 199, 223, 243, 263, 283, 303, 527.
'95 Mineral Output 375
Mining Laws 499
Artificial Sunshine 70
Asbestos 3, 131
And Its Uses 48
Assessment Work 2, 106, 151, 375, 459, 479
Assessments, Delinquent 479
Atom, The 278
Auriferous Gravels, Milling of 46
Pyrites 221
Australasia Mines 11, 107, 139, 179, 199, 303, 419
Australasian Gold Yield 107, 439
Australian Co-operative Gold Mining 114
*Automatic Hose Reel 457

B

Bacteria in Cubic Meter of Air 279
Barrels, First Notice of 423
Beet Sugar Culture in California 424
Bicycle Manufacture 150
Birth Rate per 1000 in U. S 260
Black Hills Gold Product 215, 399
Blackmail 334
*Blast Furnaces, Interior Contour of 380
Blasting Under Water 30
Blunders in Mining 150
Boat, A New 113
Boiler, The Coming 50
Expansion of by Heat 358
Experiments in Firing 174
Bolometer, The 69
Book Notices 83
Boring Glass 134
Boston & Montana Mine 353
Bowie, Aug. J 257
Brass Kept from Tarnishing 503
Bricks from Slag 483
Briquettes from Culm Heaps 444
British Columbia Mines, 11, 27, 34, 47, 54, 67, 75, 87, 94, 107, 117, 131, 139, 159, 178, 191, 215, 222, 235, 243, 262, 275, 283, 303, 323, 335, 343, 363, 382, 406, 417, 426, 447, 466, 487, 499, 507, 527.
Mining Companies 355
Mining Law 255
British Navy 503
Investments in American Mines 295
Budd, J. H 398
Butte & Boston Co 355
Butte County Mines, 10, 26, 34, 54, 67, 74, 94, 116, 138, 158, 178, 198, 222, 262, 282, 302, 322, 342, 362, 382, 406, 426, 446, 486, 506.
Butters, Chas 499

C

Calaveras County Mines, 10, 34, 54, 74, 94, 116, 158, 178, 198, 222, 242, 262, 282, 302, 322, 342, 362, 382, 406, 426, 446, 486, 506, 526.
California County Consolidation 498
Eastern Railway 87
Electrical Works 90
Experts Abroad 294
Fissure Vein Varieties 237
Geology 259
Gold Belt Geologic Survey 378
Gold Mining 257, 276, 296
Hydraulic Elevator 131
Hydraulic Mines 170
Mine Dividends 214
Mineralogist's Report 254
Miners' Association, 107, 110, 131, 151, 214, 293, 314, 337, 353, 354, 374, 375.
Mines and Miners, 9, 31, 69, 90, 115, 134, 155, 176, 195, 218, 219.
Mines and Speculation 274
Mines in London 3
Mining Convention 374
Mining Decisions 170, 190
Mining Incorporations, 12, 35, 76, 119, 140, 154, 180, 202, 231, 301, 321, 341, 384, 405, 447, 484.
Mining School 458
Mining Summary ..... Every Issue
*Oil Fuel 373
Powder Output 87
Quartz Mills 506
Salt 424

PAGE.

State University 440, 158
State University and Mining 190, 458
Supreme Court Mining Decisions, 87, 130, 131, 190.
Total Gold Production 439
Calumet & Hecla Dividends 87, 459
Cammetti Law 107, 110
Canadian Mines 199, 419, 447, 501
Canal Between New York and Philadelphia 444
Canals a Success 319
Candle Power, Measuring of 90
Cantilever Bridges 197
Car Wheel Testing 484
Careless Milling 517
Celery a Cure for Rheumatism 31
Cellular Kites 218
Centrifugal Pumps 482
Change of Air 524
Changes by Punching 70
Charges of Powder in Guns 90
Cheap Cyanide Plant 207
Methods of Mining 418
Chemical Action, How Prevented 153
Analysis, Accuracy of 338
Chicago Tower 278
Christy, S. B 399
Chrome Ore 47
Circulation of World's Papers 317
Cleaning and Sharpening Files 381
Cleveland Steel Co 455
Coal, High and Low Grade 358
Loss in Weight 90
Mining in Arizona 419
Waste Utilized 174
Coast Defense Guns 423
College of Mines 458
Colorado Iron Works 36, 261, 505
Law on Salting Mines 151
Leasing System 107
Mines, 11, 35, 45, 55, 67, 68, 75, 85, 87, 95, 107, 117, 131, 139, 159, 172, 179, 199, 223, 243, 263, 283, 303, 332, 343, 363, 383, 407, 418, 427, 447, 487, 507, 527.
Mining History—Early Development 336
*Mining Scenes 189, 193
*Railroad Advertising 189
Railroad Competition 107
State Mining Association 419
*Columbian Commission Award 1
Colusa Basin Drainage 53
Comparison of Comstock and Cripple Creek 498, 500
Compilation of Recent References to the Cyanide Process 441
Complimentary Contemporary Comment 109
Compressed Air in Foundries 197
And Electricity Working Together 444
For Street Cars 112, 402
In a Warship 422
Comstock Mines 67, 87
And Cripple Creek Compared 498, 500
"Concentrates" ..... Every Issue
Condition of Africa 442
Conductivity of Metals at Low Temperatures 196
Confusion of Mining Laws 417
Congress Mine 107
Congressional Appropriations 106
Contract Sales of Mining Property 46
Usefulness of 31
Convict Labor, Statistics of 359
Co-operative Gold Mining in Australia 114
Copper Consumption on this Coast 27
Deposits in Sonora, Mexico 358
*Matting in California 498
Mining Outlook 46
Ore Leaching With Sulphuric Acid 479
Plates, Keeping Bright 28
Production in United States, '96 ..... 171, 459
Refining by Electricity 502
Statistics 132, 499
*Corral Hollow Mines 113
Correlation of Light, Heat and Electricity 89
Corundum 6
Cost of Labor Wars 423
Mining and Milling Ore in Utah 355
Mining Ore Reduced 479
Narrow Gauge Roads in California 86, 106
County Mineral Exhibits 150
Courts and Miners 334
Cripple Creek and the Comstock 498, 500
Gold Yield 95, 96, 157, 255, 335, 439, 479
Leases 375
Mining Geology 237
*Current Motor, New 105
Cyanide Process at the Utica Mine 258
Of Gold: Solution and Precipitation 500, 520
Patents 397, 439, 518
Plant, Cheap 297
Process in the United States 316, 419
Process, Cost of in South Africa 459
Process, Recent Literature Thereon 441
Tests 379, 402, 421
Cycle Telegraphs in War 221
Cycles of Droughts 483

D

Deadwood, S. D., Mills 439
Debris Commission 67, 87, 107, 110, 127, 315, 439
Dredging vs. Impounding 421
Dams, Official Report on 439
*Dams 439
Deep Mining on the Rand, S. A 481
Del Norte County Mines 54, 74, 94, 198, 242
Delegates to Miners' Convention 407
Demonetization of Gold 419
Derricks, Ancient 218
Development of Colorado's Mining Industry 336
Of Power in the Sierras 67
Work 294
Diamonds, Artificial Production of 259, 422
Difference Between Miners and Prospectors 151
Diffusion of Metals 6
Dirt Eating 239
Director Walcott and the Geological Survey 438
Discovery of a Vein Necessary to Location 274
Divining Rod, The 315
Dock at Calcutta 358
*Dodge Improved Mill 71
Dow Steam Pump Works 76
Dr. Nansen on Depth of the Sea 524
Dredging for Gold 150
Hydraulic 403
Or Impounding Debris 421
Drift Mine Timbering 65
Drum Lummon Mine 315, 375
Ductile Iron 528
Dust Mask for Workman 30
Duty and Sampling of Lead Ores 132
*Duplex Differential Pump 353

E

Earth as a Magnet 380
Eastern Cal. Mineral Deposits 480, 501
Economy in Hoisting Plants 295
Education of Engineers 278
Efficiency of Hydraulic Dredging 403
El Dorado Co. Mines, 10, 34, 54, 67, 74, 94, 116, 138, 158, 178, 198, 222, 242, 262, 282, 302, 322, 342, 362, 382, 419, 426, 446, 466, 486, 506.
Election, Presidential, Result of 375
Electric Current, Danger from 196
Dissipation of Compounds 444
Farming 299
Furnace 6, 259
Hæmostat 462
Headlights 259
Locomotive 89
Mining 299
Motors on Chicago Roads 423
Power at a Colorado Mine 49

PAGE.

Power in Kern Co 113, 196
Power in New Zealand 462
Smelting Plant 47, 278
Telegraph, New 196
Tramway in Switzerland 403
Tramways in Genoa 444
*Electrical Advance in Railway Transmission 49
Conductivity of Aluminum 154
Copper Refining 502
*Development, Latest 149, 154
Force, Usefulness of 113
Hardening of Steel 70
Industries, Rapidity of Growth 278
Industry in the U. S 381
Oil Well Starter 89
*Power at Cottonwood, Utah 233
Railways 250, 318
Reproduction of Composition 359
Return Current Path 317
*Transmission at Fresno, Cal 5, 359
Electricity a Growing Business 196
And Rifle Practice 299
*At Nantasket Beach 217
*At Niagara 483
Direct from Coal 29
How It Manifests Itself and What It Can Do 50, 69
In Metallurgy 29, 315
In Mine Development 438
In Shasta Co., Cal 151
*Taught by Correspondence 299
Vs. Compressed Air 444
Electrolytic Extraction of Gold 378
Treatment of Low-Grade Copper Ore 48
Elements, Abundance of 6
Eminent Domain in Mining 374
Emmens' Alchemy 317, 428
Employment of Local Engineers 213
Energy Apparent in Electricity 70
English Trunk Telephone Lines 524
Sources of after Coal 7, 278
Engine Indicators 484
*New Hydraulic 129
Engineering Education 278
Specialization 278
Engines, Different Kinds Described 154
Equipment of a Laundry 524
Estimates of Civil Engineers 151
Eureka Con. Co.'s (Nevada) Annual Report 439
Eureka Hill Mine 479
Experiments in Firing a Boiler 174
Exploration Co. of London 275, 295, 499
Explosions in Mines 112
Exports of Iron and Steel 218
Export Trade of U. S 359

F

Fahrenheit into Centigrade to Convert 423
Fairbanks, H. W 420
Fenders for Street Cars 278
Files, Cleaning and Sharpening of 381
Fire in Shaft, Notes on 338
Fireproof Construction 484
Firing Cannon Under Water 525
Flour Exports from San Francisco, '96 445
Flywheel Calculations 30
*New Construction 153
Ford, T. L 67, 107, *110, 401
Foreign Capital in California Mines 150
Foresiry Commission 334
Forests and Stream Flow 70
Foul Air, To Detect 502
Fraser & Chalmers 353
Fresno Co Mines 116, 406, 526
*Sub-Station 359
Free Coinage of Gold 193
Fuel and Speed of Locomotives 114
Fulton Engineering and Shipbuilding Works, 76, 231, 341, 405, 455, 505.
Funding Bill in Congress 425
Future of the Sahara 319

G

Gases Resulting from Mine Explosions 4
*Gasoline Engines of the Chetco 313
*Hoist 85
*Marine Engines 149
Gas Power on European St. Railways 380
Prices of in Different Cities 218
*Gates Canvas Plant 277
General Electric Co 89, 133, 238
Land Office Report 96, 335
*Generator for Isolated Lighting 417
Geological Survey and Mining, 150, 170, 334, 373, 478
New Features 214, 478
Geologic Surveys of Gold Belt of California 378
Geology of California 259, 478, 502, 522
Cripple Creek, Col 237
Nevada Dist 480, 502, 522
Relation to Mineral Development 420, 478
German Silver Casting 113
Giving Automatic Signals to a Locomotive 528
Glass, Accumulation of Waste 300
Glossary of Mining Terms 112, 482
Gold Amalgamation and Alloys 358
Artificially Introduced in Rock 499
Deposits in Nicaragua 109, 256
Fields of Canada 316
Free Coinage of 193
Holdings in Different Cities 151
Imports for Sept., '96 335
In Granite and Plutonic Rocks 297
In the Guianas 296, 381, 461
*Mine in Colorado 45
Paved Valley 108
*Quartz Mill, Triple Discharge 443
Saving Process, New 316
Workers, Ancient 423
World's Output for '96 418
Gold and Silver Exports to Europe 459
Extraction Co 67
Holdings 154
Shipments from San Francisco 459
Gold Belt, Greatest 461
California, Geologic Survey of 378
Gunnison Co., Col 68
Gold Milling at Grass Valley, Cal 111, 235
Improvement in 26
Gold Mining Coming to the Front 327
Australia 114
California 257, 276, 296
Without Removing the Ore from the Earth, 419
Gold Yield of '96 477
World 334, 335, 419
*Golden Feather Gravel Plant 253
Mine 479
Government Bureau and Mine Owner 418
Coast Defense Guns 423
Coinage Rules 3
Mining Bureau 438
Gravel Mines, Value of 438
*Mining, Advance in 253
Greatest Gold Belt 461
Grove, Wm 119
Guadalupe Quicksilver Mine 295
Guatemalan Exposition 405
Gun Metal and Bronzes 443
Gunnison Co., Col., Gold Belt 68

H

Hailstones 260
*Handsome and Effective Adv't'g 189
Hearing Better with Left Ear Than Right 524
Heliographic Signals in Storms 133
Hendy Machine Works 341
*Hercules Gasoline Engine 313

*Illustration.

(Continued on next page.)

INDEX TO VOLUME LXXIII.

(Continued from preceding page.)

PAGE.

Highest Tower in the World 90
*Hoisting Engine for Anaconda 293
Six Barrels a Minute 339
Hollow Shafting Instead of Solid 133
Home Markets and Mines 254
Products Exposition 129
Homestake Mine 315, 355
Homesteads and Railroad Grants 234
Horseless Carriages 443
*Hose Reel, Automatic 457
*Hot Blast System for Copper Matting and Silver-Lead Furnaces 318
How to Frame a Report 298
Humanity, a Synthesis of 196
Humboldt Co. Mines 34, 486
Huntington Mill 119
Hydraulic Dredging 403
Elevator 131, 253
*Engine 129
*Grapple 65
Mine Failures 170
Mining Not Illegal 419

I

Idaho Mines, 11, 35, 54, 94, 117, 139, 159, 179, 190, 223, 243, 263, 283, 303, 323, 343, 363, 383, 407, 427, 467, 487, 507, 527.
Idaho Springs, Colorado, Tunnel 151
Impossibilities Made Possible 338
Impounding or Dredging Debris 422
Improved Processes for Reducing and Saving Precious Metals 256
Improvement in Gold Milling 26
Inaccurate Glass Gauge Readings 503
Index to Vol. LXII 8
India's Gold and Silver Absorption 46
*Indiana Mine, Colorado 45
Individual Owners of Gold Mines 26
Information About Mines 86
Infusorial Earth 131
Inland Canal 484
Interesting to Inventors 403
Interference of the Land Department 314, 418
Interior Contour of Blast Furnaces 380
International Boundary Line 132
Correspondence Schools 90
Inventive Faculty 88, 108, 233
Inyo Co. Mines, 10, 34, 74, 94, 116, 178, 198, 302, 406, 466
*Iron Mountain Mines, Cal 498
Investors and Pullman Cars 273
Local and Foreign 418
Iron Bar 2000 Years Old 444
Iron Ore in Mexico 70
In Shasta Co 169
Mining at Lake Superior 7

J

*Japanese Cruiser 397
Progress 484
Japan's Copper Production 439
Japan, Statistics of 359
*Jeffrey Mfg. Co 118, 259
Joshua Hendy Machine Works 51, 116

K

Kennedy Mine Tailings Treatment 277
Kern Co. Mines, 10, 34, 67, 74, 116, 138, 151, 158, 178, 198, 242, 262, 282, 302, 322, 362, 382, 406, 446, 466, 486, 526.
Kite Ascensions 403
Kluess, Geo. W 51
*Knots and Splices in Manilla Rope 25, 29
Korean Gold Mines 355

L

Laboratory Tests in Connection with the Extraction of Gold from Ores by the Cyanide Process 379, 402, 421, 442, 460
Labor Wars, Cost of 423
Land Office Business 213
Commissioners' Rulings 47, 499
Interference 314
Langhammer, Dr. P 316
Largest Canal Lock 133
Commercial Check 355
Leather Belt 175
Lassen Co. Mines 198
*Latest Improvements in Electrical Development 149, 154
*Launch Engine 443
Leaching Carbonate Copper Ore 479
Lead Ores, Duty and Sampling 132
Prices of 191
Shot, How Made Spherical 503
Leadville, Colorado, Miners' Union 151, 191
Strike 255
Leaky Raft 340
Leasing Mines 67, 85
Le Conte, Jos 224
Legislative Committee Report 401
Life Saving Stations 319
Lightning, Damage from 218
Link Belt Machinery Co 118
Liquid Air Commercially 106
List of California Mines, 9, 31, 69, 90, 115, 134, 155, 176, 195, 218, 219.
Local and Foreign Investors 418
Location Notices in California 394, 417
Law for Mining Claims 47, 67, 68, 417
Locators' Rights 314, 417
Locomotive Fuel and Speed 114
Making Plant in Russia 239
"Lode," What It Means 375
Lower Cal. Mines 55, 95, 199, 243, 467, 527
Low Grade Mines 438
Lucium 381
Lumber Exports of Washington 465
Interests of Northwest 355

M

Machinery Sales in South America 381
vs. Brains 524
Madera Co. Mines 282
Magnesium 87
Magnet Adapted to Irregular Surface 154
*Manitou Tunnel Power Plant 339
Manufacturers' and Producers' Association 53
Manufacturing Statistics of S. F. for '95 36
Marine Curiosity 48
*Engines 149
Mariposa Co. Mines, 10, 74, 158, 178, 198, 222, 242, 262, 282, 302, 322, 342, 362, 406, 426, 446, 466, 486, 506, 526.
Market Reports ..... Every Issue
Matabeleland Development Co 130
Mechanics' Institute 53, 66
Merced Co. Mines 116
G. M. Co 255, 295
Mercur, Utah, District 26, 255, 375
Metallic Carbides 503
Metallurgical Electricity 29
Metals, New for Coins 300
Meteorites 134
Mexican Copper Deposits 358
Mines 55, 70, 75, 85, 117, 159, 199, 315, 507
Mexico's Mining Industry 213
Population 455
Mica, Commercial 202

PAGE.

Michigan Mines 35, 67, 95, 139, 487
Mien, Thos 281
Milling of Auriferous Gravels 46
Mill Sites 499
Mine and Mill Reports 337
Owner and Gov't Bureau 334
Owners' Sampling 334
Promoters 234
Reports 298
Mineral and Agricultural Land 47, 397
Deposits of Eastern California 480, 501
Land Legislation 46, 66, 478
Products of U. S., '86 to '96 ..... 171, 477
Resources and Geology's Relation Thereto 420
Wool, How Made 197
Mineralogist's Report 254
Miners and Prospectors 151
And the Courts 334
Status, Past and Present 27
Wages in South Africa 355
Wages 2
Miners' Association 293, 314, 374, 398, 399, 478
Headquarters 337
Mines and Speculation in California 274
And Home Markets 254
And Railroads 518
On Mexican Grants 274
Mining and Foundry Workers' Injuries 218
And Milling, Costs of 523
And Railroading Accident Statistics 171
And Roads 458
And Scientific Press 395, 398, 400, 401, 402, 478
And the Geological Survey 150, 170, 374, 478
Blunders 150
Claim Locations 47, 67, 68, 398
Convention, '96 ..... 374, 398, 399, 400, 401
County Transportation 86
Dividends, 12, 35, 76, 118, 134, 160, 180, 202, 231, 281, 301, 321, 341, 361, 384, 405, 447, 484.
Exhibit at the Mechanics' Fair 66
Frauds 87
Geology of Cripple Creek, Col 237
Laws Needed, 354. 356, 374, 375, 376, 377, 378, 398, 417, 478.
Lawyer in the Supreme Court 314
Locations, Proposed Laws 518
Progress 294
Share Market Reports ..... Every Issue
Supt's Addresses ..... 9, 31, 69, 90, 115, 134, 155, 176, 195, 218, 219.
Will It Decline? 437
Mining Bureau Bulletin 294
State, 114, 150, 167, 170, 294, 458, 459, 477, 484, 499, 500.
Mint at San Francisco 47
Coinage First Three-Quarters of '96 375
Money of the World 197
Mono Co. Mines 116, 158, 198, 480, 506
Montana Mines ..... 11, 35, 54, 75, 95, 117, 131, 139, 151, 159, 179, 199, 223, 243, 263, 283, 303, 323, 343, 363, 407, 427, 447, 467, 487, 507, 527.
Montgomery, J. H. Co 36
Morality of Miners 418
"Mother Lode" in Cascade Mountains 521
Motor Carriage Race 525
Motor Car Contests in France 339
*New Current 105
Mountain Mines, Ltd 2, 47
Ranges 30, 133
Mount Morgan Mine 3
*Multiple Drilling Attachment 422
Mysteries in Science 30
MacArthur-Forrest Patent 397
*McKinley, Wm 379

N

*Naphtha Launch Engine 443
Narrow Gauge Railroads 86, 106
Natural Gas in Holland 317
Nature as an Engineer 503
Imitation in 524
Naval Academy and Education of Engineers 279
Neff, J. H 55, 67, 151, 400
Nervous Strain of Railway Work 31
Nesmith, Jno. W 318
Nevada Co's Gold Yield 107
Mines, 10, 54, 74, 94, 107, 116, 138, 158, 178, 198, 222, 242, 262, 282, 302, 322, 342, 362, 382, 406, 426, 446, 466, 480, 486, 506 521, 526.
District Geology 480, 502
Nevada State, Early History of 335
Gold Mines 313, 528
Mines, 11, 34, 74, 94, 117, 138, 158, 178, 222, 242, 262, 283, 302, 322, 343, 362, 382, 406, 426, 447, 466, 487, 506, 527.
*New Construction of Fly Wheel 153
Gold Saving Process 316
Small Coins 463
Theories Wanted 88
New Departure in Railroading 524
New Floor-Making Material 528
New Guinea Mines 88
New Mexico Mines ..... 11, 35, 75, 95, 117, 139, 199, 223, 263, 323, 383, 427, 447, 467, 527.
New South Wales Mines 139
Newspapers, Trees Turned Into 133
New York and Brooklyn Tunnel 423
New Zealand Mines 295
Niagara Falls Power Transmission 133, 374, 423, 483
On Tap 423, 483
Nicaragua Canal 48
Nickel 131, 275
Steel 339
Nomadic Prospector 498
North and South American Railway 238
Northwest Mining Association 215, 314, 315
Notes on a Breathing Gas Well 460
Shaft Fire and Its Lesson 388
November Meteors 112

O

Ocean Cable Changes 380
*Transit of Timber 192
Of Business Value 478
Oil as Fuel in California 273
*Engine 517
Farmers 397
Fields of California 27, 384
Motor Cars 89
Supply of World 484
Wells in Canada 404
Old and New Trinity 46
*Prospector 169
Olive Oil 7
Ontario (Canada) Mines 355
Mine 355
Oregon Mines, 11, 34, 54, 74, 85, 94, 117, 139, 151, 158, 178, 198, 222, 242, 262, 283, 295, 302, 323, 343, 362, 382, 406, 419, 426, 447, 466, 487, 506, 527.
Eastern, Placer Gold in 522
Ore Testing 4, 379, 402, 421
Overcapitalization of American Mines in London 190
"Overexertion" 114
Overwork Doesn't Pay 422
Ozone 89

P

Paints for Ironwork 239
Palermo L. & W. Co 36
Patent Laws of Mexico 503
U. S. Office Business, '95 278
Patents, Recent, Notices of, 38, 51, 83, 127, 147, 155, 187, 202, 224, 244, 261, 281, 321, 344, 364, 395, 408, 428, 447, 468, 488, 508, 534.
Total Number in U. S 278
Pelton Water Wheel Co 77, 118, 153, 339
Penberthy Injector Co 118

PAGE.

Photography in Colors 6
Pig Iron Exports from the U. S 239
Piling, How Driven in Bavaria 197
*Pine Creek District, Col., Mines 173
Pipe Covering Heat Loss 175
Pitting and Corrosion, Causes of 153
Placer Co. Mines, 10, 34, 54, 74, 116, 158, 178, 222, 242, 262, 282, 295, 302, 322, 342, 362, 382, 406, 426, 446, 466, 486, 506, 526.
Placer Locations 418
Plate Glass for Monuments 528
Platinum 27, 381
Plumas Co. Mines, 10, 34, 54, 74, 94, 116, 158, 178, 223, 242, 282, 302, 322, 342, 362, 382, 406, 419, 426, 466, 486, 506, 526.
Plummer, J. W 180
Pneumatic Power in Workshops 528
Tubes in the Postal Service 4, 2
Pocahontas G. M. Co 47
Points for Prospectors 440
Poisons, How They Act 50
Polar Explorations 260
Seas Unexplored 89
Possession vs. Location 190
Possibility of Impossibilities 338
Postoffices in U. S 340
Power from Small Mountain Streams 202
Plant at the Corral Hollow Mines 113
Precipitation and Solution of Cyanide of Gold 500
Prehistoric Mine of Aramo 27
Present Status of Power Transmission 318
Preservation of Timber 106
President, How Elected 197
Presidential Term of Office 423
Profit-Sharing Abandonment 113
"Promoters" of Mines 234
Proposed Changes in Ocean Cables 381
*Prospecting Steam Hoist 417
*Gas Engine 517
Some Points on 521
Prospector, Nomadic 498
*The Old 28, 169
Prospectors, Points for 440
Pullman Cars and Investors 273

Q

Quartz Mills, Number of in Cal 506
Quicksilver Receipts 355
Quicksilver's Properties 107, 255

R

Railroad Grants and Homesteads 234
In Corea 260
Railroads, Electricity and Mine Development 438
Methods of 517
Narrow Gauge 86, 106, 445
Rails of Wood Pulp 524
Railway Construction Statistics for 1895 239
Percentage in Different States 403
Rain, Imitation of 443
Ran (South Africa) Dividends 157, 214
Gold Output 87, 277
Saving Gold in the Mills of the 523
Randsburg Mining District 522
Records of Mine Workings 274
Reduction of Ores in Mexico 4
Refining Copper by Electricity 502
Relation of Geology to Mineral Development 420
Relocation and Abandonment 254
Relocators' Rights 334
Report of T. L. Ford 110
Resin, Rosin, Etc 107
Rheumatism, Cure for 134
Ricketts, A. B 356, 401
Rigaud Process 3, 47
Rights of Locators 314
Of Relocators 334
Risdon Iron Works 76, 90, 256, 293, 333, 344
Riverside County Mines 375, 466, 486
Robbery of Ore from Mine and Reduction Works 375
Roads and Mining 458
Robinson (South Africa) Mine 3, 357
*Roebling's Sons, Jno. A. Co 58
Roessler & Hasslacher Chemical Works 140
"Rock in Place. What Is It?" 66, 109
Rock-Drilling Contests 67, 71, 87, 107, 215
Rod Type of Trolley 133
Roentgen Rays 318, 502
*Future 174
Rossland, B. C., Output 439
*Rosalie Mine 85
Rubber Goods Cracking 31
Russian Mines 419

S

Sacramento County Mines 382
Sahara, Future of 318
Sale of a Famous Mine 130
Sales of Mining Property on Contract 46, 86
Salting 438
Mines, Colorado Law 151
Salt Rainfall in Utah and Wyoming 359
Sampling Gravel Mines 170, 171
By Mine Owners 234
Works on Frontier 499
San Bernardino Co. Mines, 34, 74, 87, 138, 178, 262, 382, 466, 526.
San Francisco Mining Investments 418
San Diego County Mines, 10, 54, 94, 116, 138, 158, 222, 262, 282, 322, 362, 382, 406, 466, 486, 506, 526.
* Sand or Sediment Trap 175
Sanitation, Improved 403
San Joaquin Electric Co 67, 359
Santa Barbara County Mines 242
Scientific Joking 380
Seal Catch of '96 384
Secretary of Mines in Cabinet, 86, 132, 254, 417, 418, 459, 479.
Seismic Recorder 112
Separation of Silver from Gold by Volatilization 4
* Sequoias, Young 28
Shaft Fire, Notes on 388
Shafting, Hollow Instead of Solid 133
* Shasta County, California, Copper Mines 498
County Mines, 10, 34, 74, 94, 116, 138, 159, 178, 222, 242, 262, 282, 302, 322, 342, 382, 406, 419, 426, 446, 466, 486, 506, 526.
Shoes and Dies, Wear and Tear of 131
"Shooter"—What It Is 131
Shotgun Barrels 422
Sierra County Mines, 34, 54, 74, 116, 158, 178, 198, 242, 262, 282, 302, 322, 342, 362, 382, 406, 426, 446, 466, 486, 526.
County Miners' Association 315
Silver and Miners' Wages 2
And Gold Holdings 154
And Gold Shipments from San Francisco 459
And Gold Exports to Europe 459
Probabilities 439
What an Ounce Costs to Produce 131, 295
Siskiyou County Mines, 10, 34, 54, 74, 94, 116, 138, 158, 178, 198, 222, 242, 262, 282, 302, 322, 342, 382, 406, 426, 446, 466, 486, 506, 526.
Skeleton Mine Reports 298
*Slag at Smelting Plants, Disposing of 525
Smith, Hamilton 224
T. N 259
Smoke, How Best Disposed of 153
Smuggler-Union Mines, Telluride, Col 461
Solution and Precipitation of Cyanide of Gold 500
Solvent for Gold and Silver 339
*Sonntag, Julian 76, 88
South African Coal Output 331
Deep Mining 481
Mine Labor 315, 375
Mines, 3, 35, 47, 75, 118, 159, 179, 191, 223, 235, 243, 263, 295, 323, 363, 383, 407, 419, 427, 507.
South American West Coast Trade 119

PAGE.

South Dakota Mines, 35, 55, 75, 139, 159, 179, 199, 223, 243, 263, 283, 303, 323, 343, 363, 407, 427, 447, 467, 487, 507, 527.
Southern Pacific Railway Co 53
South Yuba Water Co 76
Specialization in Engineering 278
Speculation in California Mines 274
Spontaneous Combustion of Coal 317
Spring Valley Mine, Cherokee, Cal 439, 446
* Springer Concentrator 85
Stamp Battery Development 378
Stamps, Number in California 506
St. Auburn, W. T 160
State Mining Bureau, 67, 70, 150, 170, 191, 254, 2 5, 294, 499.
Work and Mining Interests 170
Stealing Other People's Inventions 378
Steam Boiler of the Future 50
Pump—What It Is 3
Gauge Testing 484
Steel Affected by Electric Current 174
Burned, to Restore 423
Hardened Electrically 70
Highways 30
New Manufacturing Process 402
Slag 70
Stone Industry of the United States 275
Walls, Why Damp 31
Storage of Water in Earthen Reservoirs 480
Street Railway Power Economy 278, 402
Submarine Wrecking Vessel 359
Subsidence, French Decision on 340
Submarine Cable Between New York City and Hayti 524
Success of Canals 319
Sullivan Machinery Co 90
Sulphur Mine, Humboldt, Nev 107
Sunlight's Action on Moist Organic Matter 299
Supply of Oil in World 484
Supreme Court Decisions 26, 130, 170, 191
Swindling Investors 518
Syenite, Difference from Granite 27
Synthesis of Humanity 196

T

Tax on Mine Output 295
Technical Society Work 317
Telegraph and Telephone Business 524
Telegraph, New Electric 196
Steel 113
Telephone System, New 154
Tempering Reamers and Taps 70
Tesla, Nicola 114
Testing Car Wheels 484
Steam Gauges 484
Theft of Ore from Mine 315
* Thurman Oil Burner 273
Timbering in Drift Mines 65
Timber Preservation 106
Tin Imports to U. S 340
Tin Statistics for '96 444
Tomboy Mine, Sale of 335
Torpedo Boats for U. S. Navy 319
Destroyer 30
* Tornado, Picture of 6
Trail Creek Mining District 236, 335
Training a Locomotive 444
Transcontinental Arc 338
Trees Turned Into Newspapers 133
Tricks of Ancient Gold Workers 423
Trinity County Mines, 10, 34, 46, 54, 87, 131, 138, 158, 198, 243, 262, 322, 342, 382, 426, 446, 466, 486, 506, 526.
* Triple Discharge Gold Quartz Mill 443
Trolley Line in Paris 524
Trolley, Rod Type 133
Tube Welding by Hydraulic Power 403
Tunnel Between New York and Brooklyn 423
Tuolumne County Mines, 10, 54, 74, 116, 158, 178, 198, 222, 242, 262, 282, 302, 322, 342, 362, 382, 406, 426, 446, 466, 486, 526.
Turbine Wheels 30
Turquoises 114, 441
Two-Mile Shaft, Proposed 521

U

Uncle Sam's Warships 218, 472
*Union Gas Engine Co 85, 149
Union Iron Works 76, 244, 261, 341, 397
University, The New 440
U. S. Debris Commission 67, 87, 107, 110, 127, 315
Geological Survey 315, 458, 459
Mint Coinage '96 ..... 419, 459
Population, Statistics of 444
Supreme Court Decisions 151
Utah Mines, 35, 54, 67, 75, 95, 107, 139, 159, 179, 199, 222, 243, 263, 283, 303, 323, 343, 355, 363, 383, 407, 426, 447, 467, 487, 507, 527.
Utica Mine Cyanide Process 258
Utility of Inventions 259
Utilization of Waste Water 278
Utilizing Culm Heaps 174

V

Value of Gravel Mines 438
Varieties of California Fissure Veins 237
"Vein," Difference Between It and "Lode" 375
Discovery Necessary to Location 274
Walls 152, 172, 194, 218
Velocity of Projectiles, Measuring 196
Vicissitudes of Mining 275
Victor Mining Co 255
Virtue Mine 85
Visiting Miners 234
Von Der Ropp, A 256
Vulcan Iron Works 51, 118, 364

W

Walcott, Chas. D 261
Want of Sampling in Hydraulic Mines 170
Washington Mines, 11, 31, 54, 74, 94, 117, 131, 139, 159, 178, 198, 222, 303, 363, 406, 426, 447, 467, 487, 506.
Washburn-Moen Mfg Co 36
Waste Made Valuable 462
Waste Slag Utilization 339
Water in the Earth's Crust 463
Journeyings of 114
Power, New Invention 129
Pressure, Force of 218
*Ram in Pipes 462
Right Decision 65
Storage in Earthen Reservoirs 481
Utilization of Waste 278
Western Real Estate and Building 300
Union T. and Am. Bell T. Co.'s 319
Westinghouse E. & M. Co 20, *154
Westralian Mine Revenues 355, 437
Whaling by Electricity 30
What Is "Rock in Place?" 66
White Lead, Electrolytic Method 30
Whitney, J. D 160
Wildcats 354
Williams, G. F 191
Will Mining Decline? 437
Wire Glass 7
More Valuable Than Gold 113
*Woodbury Concentrator 118, 233
Wood, Weight of Green and Dry 463
World's Gold Yield 334, 335
Oil Supply 484
Wright, Jno. M 68
Wyoming Mines ..... 11, 117, 139, 179, 199, 223, 243, 263, 303, 383, 307, 447, 523.

Y

Yacht, The Largest Electrical 278
Yale, C. G 400, 401
Yield of the Rand 277
Yuba Co. Mines 10, 34, 74, 446, 486
Yukon Placers 397

* Illustration.

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